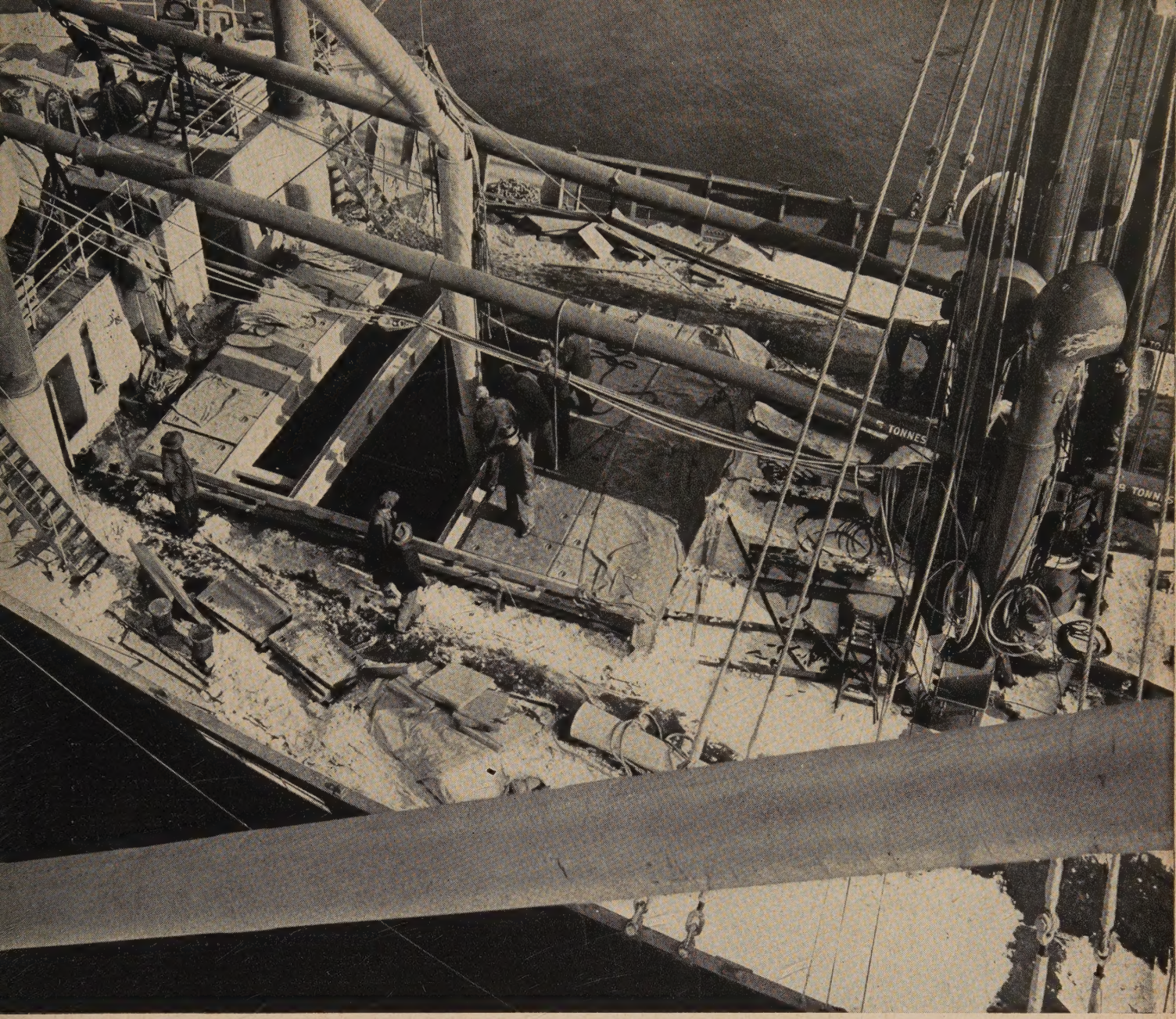

JULY
1951

A French grain vessel being loaded by spouting at pier of the Port Authority Grain Terminal in Brooklyn, N. Y.

Grain

THE MAGAZINE OF PLANT MANAGEMENT AND OPERATION

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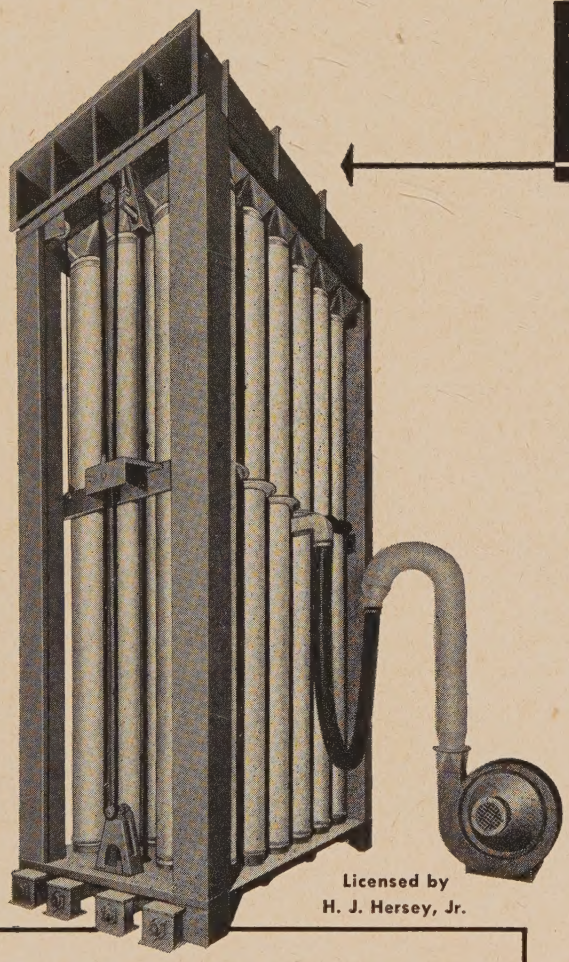

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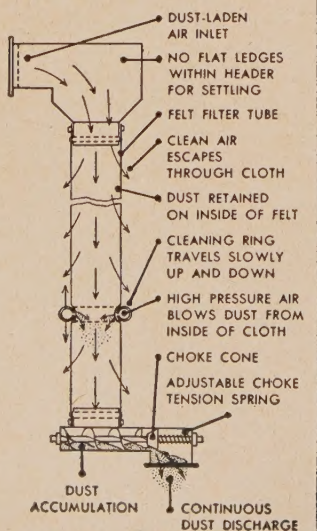

Write-to-DAY for Bulletin 491

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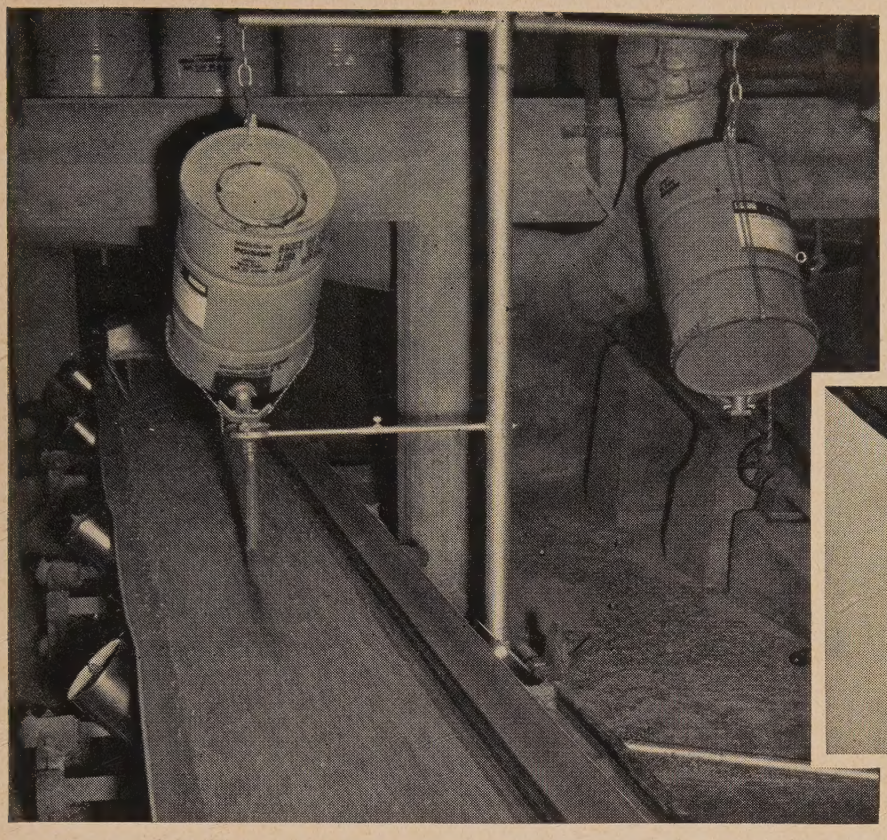

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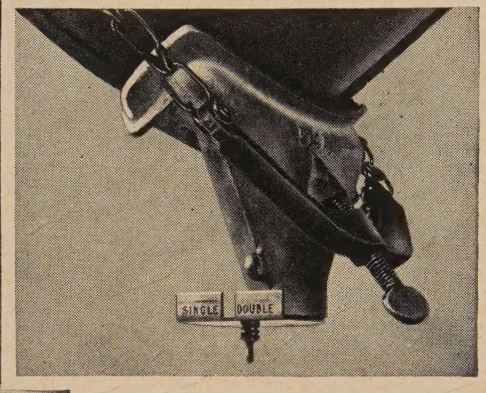

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WHEN USED AS DIRECTED CYANOGAS G-FUMIGANT HAS NO INJURIOUS EFFECT ON THE MILLING QUALITIES OF GRAIN OR THE BAKING QUALITIES OF FLOUR

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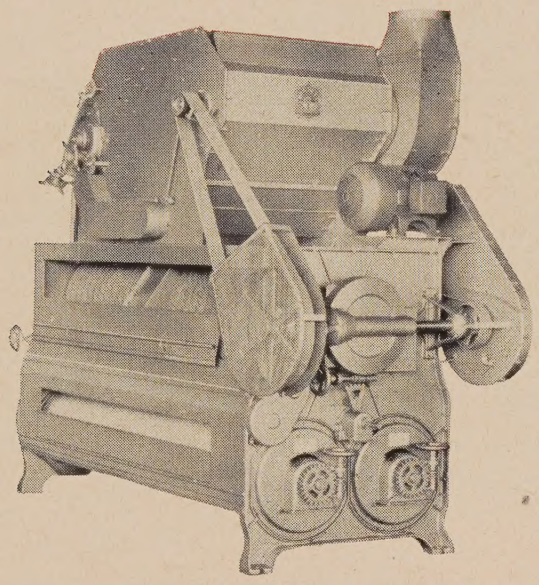

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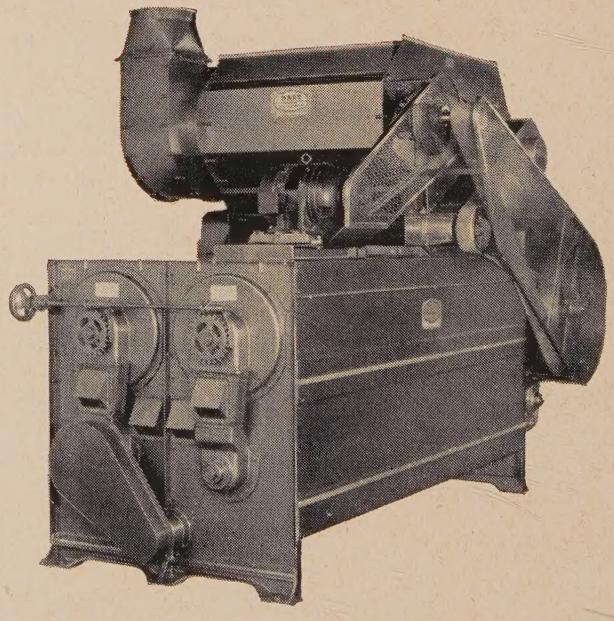

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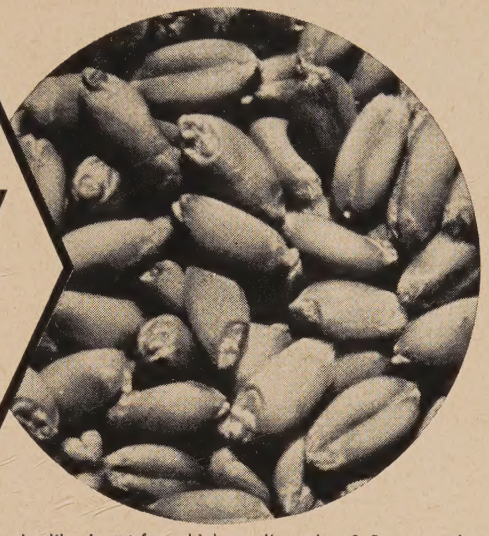
New Methods Cut Incidence of INSECT FRAGMENTS in flour

hidden infestation in wheat can now be REDUCED by practical, use-proven techniques



Looks like insect-free, high quality wheat? But see what the X-ray picture at the right shows! This new test was recently described in the May issue of *Farm Journal* magazine as a vitally important new aid to grain buyers — a practical way to detect hidden infestation that will show up later as insect fragments in flour.

The same sample of wheat under the X-ray test. Note the dark areas or cavities eaten away by weevils. The weevils themselves look like small white grubs. Use of Pyrenone Wheat Protectant by the farmer and wheat handler can prevent this costly hidden infestation.

Millers and wheat handlers no longer have to put up with the high cost of weevily wheat!

New X-ray tests make it easier, more practicable than ever before to check wheat for weevil damage before you buy. New PYRENONE* Wheat Protectant makes it possible for the first time to PREVENT . . . not cure . . . insect entry into stored wheat.

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USE-PROVEN — Pyrenone-based insecticides have long been used by leading millers and grain handlers as sprays in mills, warehouses, elevators and boxcars — wherever high effectiveness against insects and freedom from toxic hazards to warm blooded animals are essential. Now Pyrenone has been combined in *Protectants* that have already begun a "revolution" in agriculture's approach to the stored-grain insect problem.

Pyrenone WHEAT Protectant, as its name implies, is specially formulated for use on stored wheat.

Pyrenone® GRAIN Protectant is formulated for use on corn, oats, rye, barley, rice, grain sorghums and other small grains.

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THIRD — Make sure farmers and grain handlers from whom you buy know that insect-free wheat brings a higher price.

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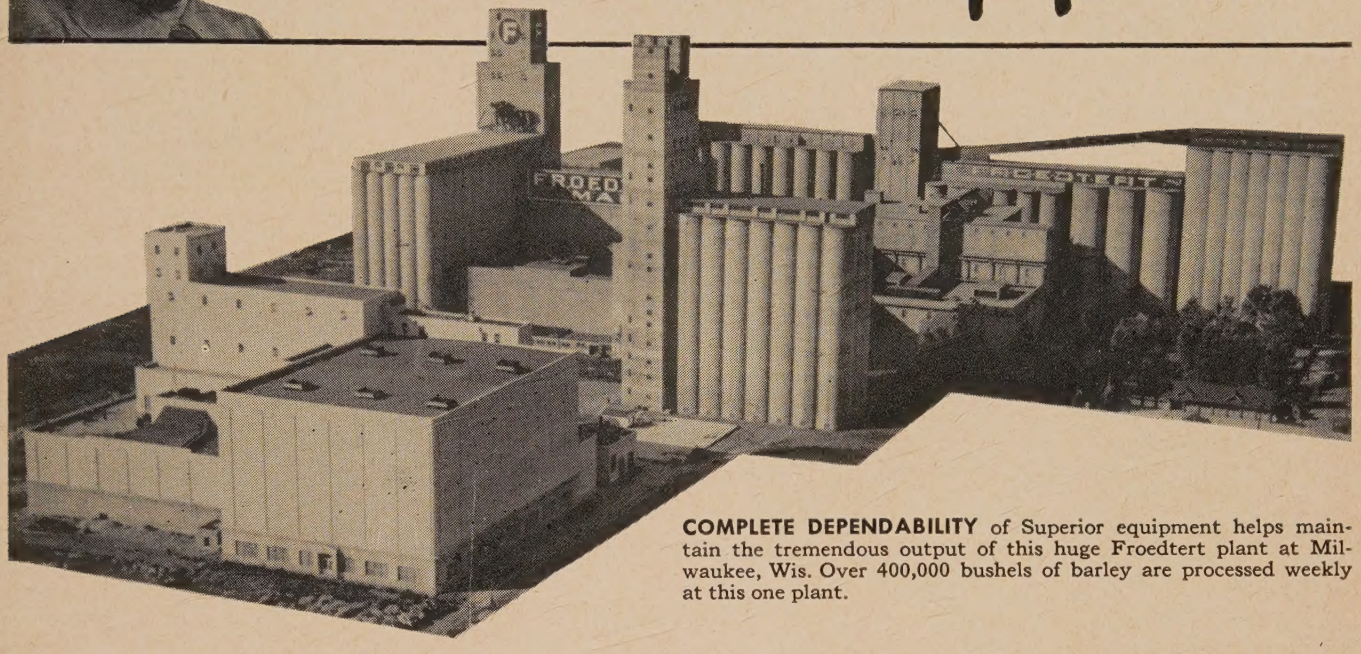
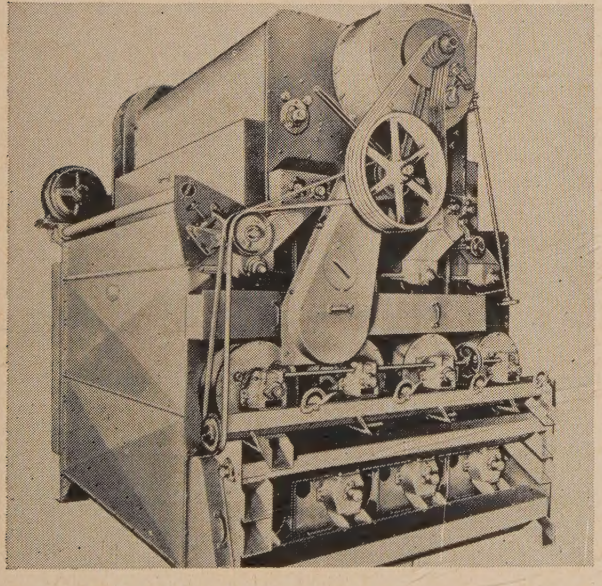


COMPLETE DEPENDABILITY of Superior equipment helps maintain the tremendous output of this huge Froedtert plant at Milwaukee, Wis. Over 400,000 bushels of barley are processed weekly at this one plant.



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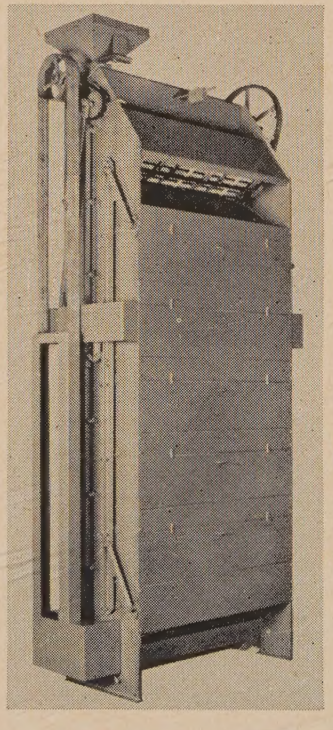

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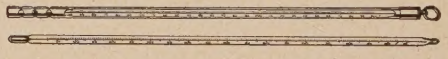

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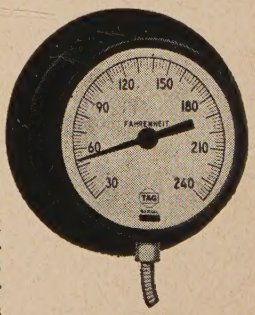


Southwestern Hard Winter Wheat

SICK WHEAT DAMAGE

By R. H. JORDAN
Grain Inspector, Oklahoma City

FOR the past 20 years I have been inspecting sick and damaged wheats and observing their handling. The conclusions of the following discussion are based upon that experience and observation rather than upon any program of scientific studies or extended laboratory tests.

There are seven distinct types of damage to hard winter wheat under our present grain grading standards, included in the heading "Total Damage". They are in order of frequency: Sick wheat, weevil damage, sprout damage, heat damage, fungus, green damage and frost damage. Sick wheat is the most outstanding; in fact, in a year of normal harvesting conditions about 90% of the damage found will consist of sick wheat.

Sick wheat, weevil and heat damage are related in this sense: They result from excess moisture content and/or lack of efficient handling facilities, negligence of—or lack of understanding of—the principle of proper handling of wheat. Sprout, fungus, green and frost damage are caused by weather conditions and usually are unavoidable by the producer.

Can't Cure "Sick" Wheat

Sick wheat replaced sprout damage as the principal kind of damage soon after use of the combine began. This type of damage is sometimes called "bin-burnt", "musty", "germ damage", "dead germ", "black germ" and "dead wheat". The term "sick wheat" itself is rather unfortunate; it suggests a condition that can be cured—that handling or treating in some manner may restore it to its original soound state. As will be discussed later, while this damage may be arrested, it cannot be cured.

There are many theories advanced by wheat handlers and farmers why wheat will "heat" or become damaged. One heard frequently is that all wheat must "sweat" and necessarily become warm in the process. Now it may be necessary for wheat to experience a chemical or biological change. However, some tests made just last summer upon some dry wheats that have remained sound until the present, showed that the temperature of the bins did not rise even one degree higher than when they were filled at harvest, and the bins have not been turned from then until now.

Some think that mold which is always present on the wheat can kill the germ without any heating of the grain, while others ascribe mold itself as the cause of heating. Mold, of course, will develop if wheat has been allowed to heat long enough to cake. Whether mold is a cause or contributing factor, I do not know. More important is that neither mold nor heat will develop in dry wheat.

Another opinion has been that tremendous pressure of the wheat weight in tall bins causes heating and damage. This, of course, can hardly be the case—otherwise all wheat in tall bins would show some damage. Many millions of bushels remain all year long in tall bins without a trace of such damage. Wheat can heat in farm bins piled less than a foot deep.

Stored Wheat Insulated

Any fear as sometimes expressed that higher temperatures and humidities of certain weather conditions can affect stored wheat so that it will absorb moisture or heat, is groundless. Bin-stored wheat is well insulated and only a very small surface area is exposed. Although weather conditions extend over wide areas, one of two bins side by side and identical in construction, can heat badly while grain in the other remains sound.

The cause of sick wheat damage can be expressed in two simple statements: Only wet wheat can become sick. Wet wheat gets sick only if it be allowed to heat.

Definitions

It would be well here for exact and clear meaning to define some terms used in this discussion. "Wet wheat" in my estimation is wheat containing more than 12.4% moisture, while "dry wheat" has 12.4% moisture or less.

"Heating" wheat is wheat reaching a temperature of about 100° F. or higher as a result of its own spontaneous reaction, not wheat artificially heated.

"Sound" wheat is that in which the germ remains cream-colored and alive—the bran is not discolored. "Sick" wheat is dead wheat—invariably it has a discolored germ and the bran coat may also be discolored.

The level of 12.4% moisture is a figure that has become obvious through the grading of thousands of wheat carlots and hundreds of bins. All cars found heating contained moisture higher than 12.4%. No cars with 12.4% or less have yet been found heating, unless there happened to be a truly excessive amount of green weeds or seeds or similar material in the wheat.

Moisture content of inbound carlots in an average year ranges from 12.2 to 12.4%. Bins being turned under the most favorable of conditions will cease losing moisture somewhere in this range of 12.2 to 12.4%. In wheat lots that have heated, then cooled off slowly of their own accord, I have found their moisture content also to be 12.4%. Lower moisture is, of course, found in normally field-dried wheat or wheat artificially dried.

Sick wheat can be considered to pass through three stages of increasing deterioration. The first stage occurs when heating has raised the temperature to about 100° F. and the first evidence is a slight discoloration beginning at the lower part of the germ and extending up through the germ as heating continues.

Deterioration Stages

In the first 48 hours the germ color may become dark brown depending on how wet the grain is and on other possible contributing factors such as molds, which may increase the rate of heating. It is difficult to detect sick wheat in this stage for if the wheat has been cooled and heating arrested, bran color still remains normal; germ coat must be scraped to detect the damage. From 20 to 30% of wheat at this stage must be present in a sample before it grades "musty".

Heating wheat will pass into the second or middle stage after 48 hours or so at 100° or higher. The heating accelerates rapidly—the germ turns black and the bran appears glazed. Most wheat graded "sick" falls into this category. Presence of 15% or more of sick wheat at this stage will render a grade of "musty".

The third and final stage of sick wheat damage is reached if heating continues without attention. Portions of the bin will become caked and mouldy. Germs appear black or mouldy gray. Bran of vitreous wheat will turn a dull dark red shade similar to that of Red Chief, and chalky wheats will sometimes show a bleached or sallow bran color. Bran coats will have a "limed" feeling to the touch. Cars with as little as 10%

of this stage of damage have been graded "musty".

Deterioration at this stage has progressed as far as possible for wheat to remain in the "sick" classification. Indeed the bran color may border on that seen in "heat damaged" wheat. This is a following damage classification wherein wheat has heated to an extent of time and temperature that practically roasts the kernel to a deep mahogany or black color in bran, germ and endosperm.

Turning Wheat

Most elevator men feel that turning their wheat stock assures it remaining in a sound condition. However, many of them who have said they turn their wheat from every two weeks to once a month are at a loss to understand why their wheat goes out of condition, why sick wheat damage occurs.

Since sickness develops from heating, and heating depends upon the moisture in the grain, it can easily be seen that turning periodically cannot insure safety. Heat must be lowered under 100° and moisture to the 12.4% level. Wheat being turned is really exposed to the air only a very short interval quite insufficient to cool and dry to these points, unless ambient temperatures and humidities are extremely low, a condition seldom found during the harvest season.

I would like to mention some tests and observations which illustrate that turning wheat is frequently ineffective. Tests made in summertime showed that less than 5° F. drop may occur, whether wheat is heating or not. Many times the wheat lost no heat at all, and if air temperature is higher than that in the wheat, the wheat may even become slightly warmer.

This last fall temperature of a bin was 85°, outside temperature 55°; turning reduced the wheat to 78°, a loss of 7°. However, in the summer a bin at 105° was turned, losing only 5°. Naturally, unless this stock be turned a couple of times the next few days, temperature would begin rising again and increase damage to the germ. Turning sometimes is necessary as a quick check upon rapidly rising temperature of a bin. The higher the temperature, the more rapidly will the heat increase. Wheat at 90° F. will advance to the damaging 100° much more quickly than 80° wheat advances to 90°.

One plant this year unloaded a large wheat shipment with 13.9% moisture. This was turned over a cleaner four times in a two months period. At the end of that time the moisture was 13.7%—a difference of 0.2%, just about the experimental error of a moisture determination. Only when there is a very wide spread between moisture of the air and of the wheat can turning be effectively utilized for drying.

It is impractical to turn wheat that does not require it. An elevator man should carefully watch and assess other factors besides moisture and temperature, especially when wheat is being moved: Test weight, amount and kind of dockage, and any sign of weevil infestation. Weevil pockets in wet wheat are particularly dangerous, for they themselves furnish heat which will accelerate the heating. On the other hand, I have seen dry wheat heavily infested, yet germs remained sound.

Heating Less in Light Wheat

Heating can occur in grain of any test weight, but less is found in lighter wheat, 57 lbs. and lower. While years of low test weight are often seasons of dry ripening and harvest conditions, yet generally considering high moisture wheats, the lighter wheats seem to keep a little better than those of heavier test weight.

An opinion common among grain handlers is that early maturing varieties will suffer heating and sick damage more readily or rapidly than others. I have observed, however, no significant difference in susceptibility or heating rate among wheats, regardless of variety, area or season.

Now some varieties like Triumph and Pawnee do seem to dry faster than the Blackhulls and Chiefkan. Rain or dew moisture upon wheat already field-dried can be removed much more readily than the "bound" or "green" moisture of grain cut before drying is complete.

"Flat" storage (sheds, hangars, etc.) has often been considered an unsafe storing practice. If the floor is above ground level and wheat put in with 12.4% moisture or less, it will keep soundly and safely from heating.

Among practices suggested to keep wheat in sound condition, to dry and cool and to avoid turning, are these: Use of weevil fumigants, and of conditioning compounds found to be nothing but soda, claimed to prevent or at least retard heating. None has proved successful. Dry wheat requires no treatment; if wet, I would not care to risk thousands of dollars worth of grain with such methods.

The Elevator's Problem

What then, can an elevator do, when faced with storing wet wheat stocks? Turning is slow, expensive, and unsure under most conditions. The best and surest method is to blend with dry wheat! Very wet wheat can be kept quite safely if mixed with drier wheat so that average moisture of the blend is 12.4% or less.

Usually this can be done. In some harvests, however, continuing rains keep the ripe wheat wet, and farmers are forced to combine or else lose their crop. There is simply a lack of enough dry grain to control and lower the moisture content of stored wheat to the safe level. Just this last summer such a condition took place over wide areas. Elevators bought the crop with little discount—and inevitably sick wheat developed.

Elevators, of course, do buy wet wheat nor do I advocate they shouldn't. It is only fair though that they discount it proportionately to the moisture loss possibly sustained plus handling costs and coverage for potential hazards always present in such storage. Buyers ordinarily do not discount when purchasing farm wheat with 14% moisture, yet if they store this for any time, they must expect a loss of 1.6% to bring down the moisture content to 12.4%, the safe level for keeping.

Wheat at present prices costs about 3½ cents a pound; a material shrinkage of 1.6% entails a cost of 3.4 cents per bushel. Add to this the cost, figured conservatively at a cent a bushel, for turning and blending with drier wheat—the total cost is raised to 4.4 cents per bushel. And at 15% moisture in purchased wheat, shrinkage plus handling cost amounts to 6½ cents per bushel.

Moisture Checking

To buy wisely and safeguard storage it is necessary to maintain close and constant checks upon moisture levels. The old "feel and chew" method is quite unreliable except for extremes. Moisture meters used should be checked often and regularly, for quite a few machines at country points have been found to be out of adjustment.

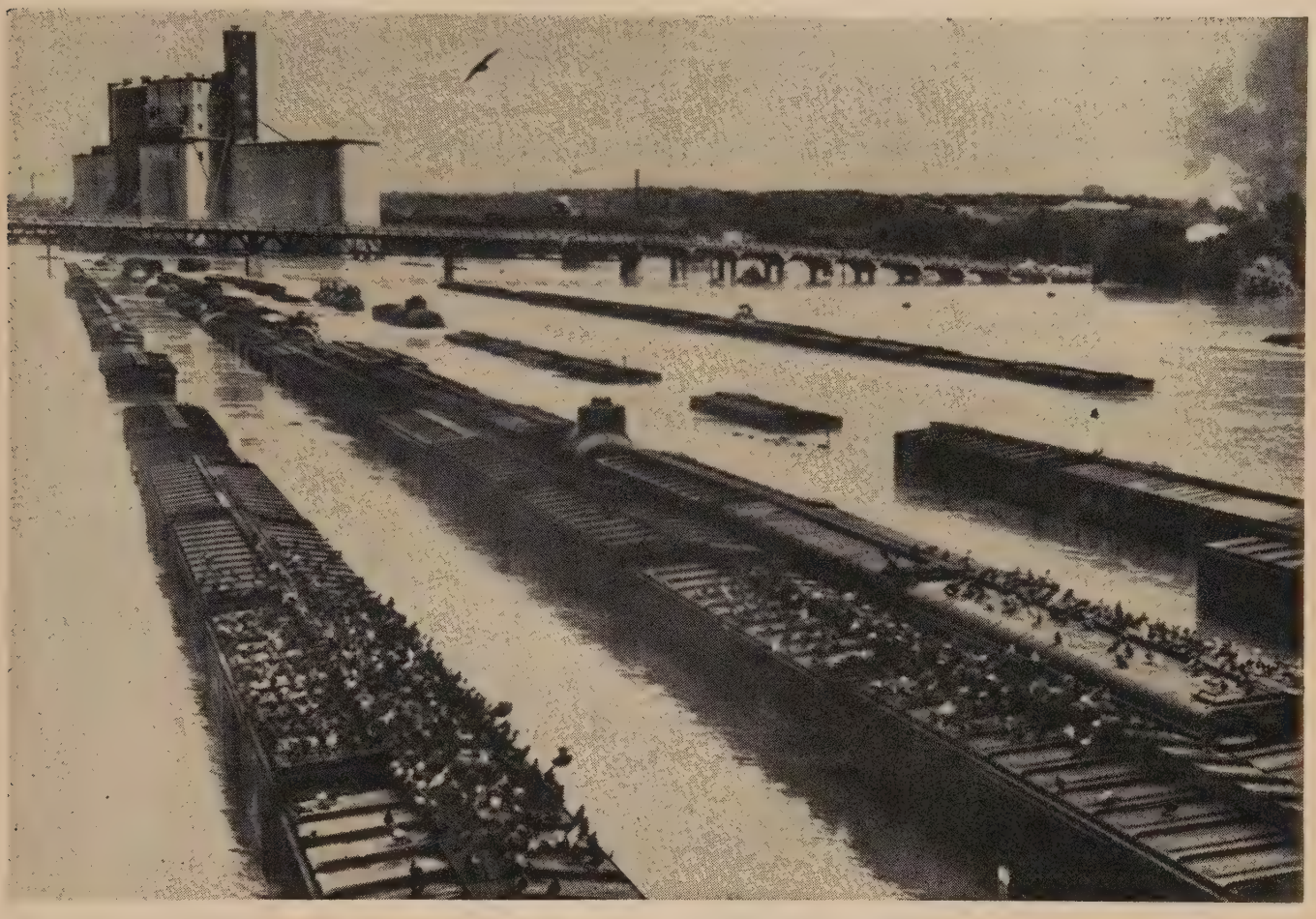
A few buyers are not as thoroughly familiar with moisture meter operation as they should be. Inaccurate or false moisture information may prove to be more expensive than none at all.

To my knowledge, no one, regardless of his experience, can pick up a sample of wheat containing sick damage and with any degree of accuracy guess the percent damage. An inspector determining sick wheat spreads about 30 grams of a representative portion of the sample over a straw-colored paper or board. He examines each kernel carefully. Germ coats of kernels not obviously sick are scraped back to see if the germ is discolored.

Less attention is given bran color, as appearance of the germ is the determining factor. More than 10 minutes may be required to separate sick wheat from a sample containing an appreciable quantity of it. Magnifiers and different kinds of lighting have been suggested and tried as aids, but I have so far found nothing more

(*Please turn to Page* 30.)

And Then Came The Deluge!



Waters surrounding grain cars in the Armourdale section of Kansas City, Kans. Note pigeons, deprived of usual supply of food around elevators, perched on top of cars. In left background is Rock Island Elevator operated by Simonds-Shields-Theis Grain Co. Smoke column at right is burning oil storage tanks. (Acme telephoto)

THE floods in Kansas and Missouri this month were unexpected and consequently people were unprepared for their advent. Kansas rivers, especially tributaries of the Kaw River in the northeast part of the state, are often frolicsome in the late spring and now and then go on a rampage. However, rarely do floods occur in mid-summer, particularly to the tune of over $1 billion estimated damage in Kansas alone.

This year heavy rains swelled most of the Kansas streams. The rains were a phenomenon themselves at this time. A few scientists have gone out on a limb by ascribing them as due to rain-making programs in the arid areas, which spread to other sections. Time and research will determine whether they are right. The fact remains that high waters, centering first in the Kaw River at Topeka, moved down to other towns in the eastern part of Kansas and on to the two Kansas Citys. The upper part of Oklahoma was also hit.

In this whole region as the grain trade is well aware are many big grain elevators which were directly in the flood path. The Kaw River overflowed into the Armourdale and Argentine sections of Kansas City, Kans., and on to the Missouri, causing devastation in its wake.

Kansas City Plants Damaged

Waters entered the plants of the Standard Milling Co., Rodney Milling Co., and United Mills (owned by Loose-Wiles Biscuit Co.). Other mills were reported undamaged but were shut down as a precautionary measure.

The Kansas City grain market was closed on Saturday, July 14, because of the paralysis of rail transportation and shutdown of nearly all grain elevators and grain processing plants. Among the grain elevators partly inundated (besides the mill elevators) were the Santa Fe Elevator (operated by the Tex-O-Kan Flour Mills Co.) and the Rock Island elevator (operated by the Simonds-Shields-Theis Grain Co.) and shown in above picture. Water surrounded the River-Rail Elevator (operated by the Hart-Bartlett-Sturtevant Grain Co.) and the Great Western Elevator (operated by Wolcott-Lincoln, Inc.), but did not rise to the tanks. The elevator of the Farmers Union Jobbing Assn. in this district was flooded. The Katy elevator (operated by the Kansas Grain Co.) was in a flooded area but water was confined to the basement.

Most of the railroads serving the flood-stricken area imposed embargoes, restricted operations and re-routed many grain shipments. Only two lines, the Kansas City Southern and the Milwaukee, were reported to be in nomal operation. A special ICC order permitted re-routing without penalty charges.

General embargoes were issued by the Santa Fe and Missouri-Kansas-Texas lines. The Burlington was able to handle freight for all points except cross-town switching. Other railroad orders were:

Union Pacific—No operation from Salina east to Kansas City, to or via that division.

Wabash—No operation west of Brunswick, Mo.

Gulf, Mobile & Ohio—No operation from Kansas City to Gilliam, Mo., and east.

Chicago, Great Western—No operation south of St. Joseph.

Missouri Pacific — No operation

FACTS . . .
NOT FICTION

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Kaw Valley Plants Suffer

Reports from grain elevators, feed mills and flour mills throughout the Kaw Valley showed that this section had sustained severe damage. Plants at Topeka, Salina, Manhattan, Junction City, Abilene and as far west as Hutchinson were shut down. At least 40 alfalfa dehydrating plants were affected. According to a bulletin from the American Dehydrators Assn. the latter will suffer a heavy loss in addition to loss of alfalfa acreage flooded over a half million acres.

St. Louis Damage

The swollen Missouri carried the flood tide down to St. Louis, where special damage was caused in West Alton, East St. Louis and the river front of St. Louis proper. On July 17, news flashes came that no grain could be unloaded in St. Louis except at the Missouri Pacific Elevator operated by Continental Grain Co.

Elevators in the St. Louis area include two of Continental Grain Co., two of Cargill, Inc., one of Norris Grain Co. (N. St. Louis) and one of Checkerboard Elevator Co.

Handling Flood-Damaged Grains

Crest of the deluge was reached about July 17. On the following day a meeting of Kansas City Board of Trade officials, grain dealers and processors, federal and state grain supervisors and Food and Drug representatives worked out the following plan to expedite removal of cars of flood-damaged grain from tracks, also proper processing of damaged grain:

Shipments Resumed

On July 19, with the water subsiding rapidly the Transportation Depts., Kansas City Board of Trade, issued the following bulletin:

"There is now no reason whatever why all lines should not freely accept grain billed to Kansas City. If you know of any instances where a railroad is refusing to accept grain for Kansas City, let us know at once so we can handle with the proper authorities.

"The Union Pacific is now accepting shipments of grain into Kansas City without restriction, which means that if they are unable to handle the grain into Kansas City over their own line they will divert it to some line like the Missouri Pacific which can do so.

"There was some misinterpretation of the ICC Order No. 52 to the effect that it only applied on grain on hand at the time the order was issued. This, however, is not so. ICC advises that the order is a continuing one and under that order the railroads can freely accept grain, diverting where necessary."

Report of SOGES Committee on

Grain Car Doors

HENRY J. ANDERSON, Acting Chairman
Bunge Corporation, Minneapolis

THE problem of the Grain Car Door Committee is one of trying to pacify every one. This is very difficult to do. As a matter of fact it's almost impossible, since the Society is divided about half and half as to the advantages and disadvantages of paper grain doors.

We found that each plant has its own problems and that actually there is nothing that we can do as a committee to solve these problems. It was found that when necessary the plants would solve their own problems and difficulties that went along with the use of the paper grain doors.

The committee feels that the paper grain doors are here to stay for some time at least. This is largely because the railroads are responsible for having these paper grain doors and are apparently saving a considerable amount of money on each car where the paper grain doors are used.

Responsibility

We as a group should start working with all concerned on the disposition of the debris that is left in the car or on the ground that is the cause of most injuries. It seemed that since we do have the paper grain doors we should concentrate our efforts in the direction of the safest practice in the use of these doors. Consequently the committee has resolved to expend its time and energy toward placing the responsibility and cost of clean up after the paper grain door has been used.

This does not mean that we stand 100% behind the use of the paper grain doors. We ask that those who are opposed to the use of paper grain doors to please send to the chairman of your committee, concrete facts on which we can work. We must have figures to back up our claims.

Facts Needed

How many cars do you unload and what is the percentage of leaks in those cars? What is your cost of installing paper grain doors as against the cost of installing wooden grain doors. Give us actual figures and facts on injuries attributed to use of paper grain doors directly. In other words, supply us with information with which to combat the people who have figures showing the advantages of using paper grain doors. Unless we have these figures, we can do nothing in helping you fight the problem of the paper grain doors.

Is there any laxity on the part of the coopering people or any one? If you have your own deal of coopering and cleanup, it's your own responsibility, but if the coopering people don't do a good job of cleanup in these cars that have the paper grain doors in them, let us know by letter.

We will see in that case whether we can't work up some kind of a form letter to send them—not a belligerent letter, but a sort of a suggestive letter asking them to please watch these paper grain doors because of injuries, etc. Then let us know whether the situation has been corrected.

If they have started cleaning up fine. If they haven't and continue to be sloppy with their work, send them another letter and keep sending them and pounding them until the situation is corrected. I believe that is about all we can do on this situation now.

This paper grain door thing could go on and on and on perhaps for years. As a committee working on both sides of the question, it is a little rough. We have too many people to please. It might be a good idea to have one committee for paper grain doors and one committee on wooden grain doors, and have a debate up here and really get the thing settled. It would be a hot discussion we're sure!

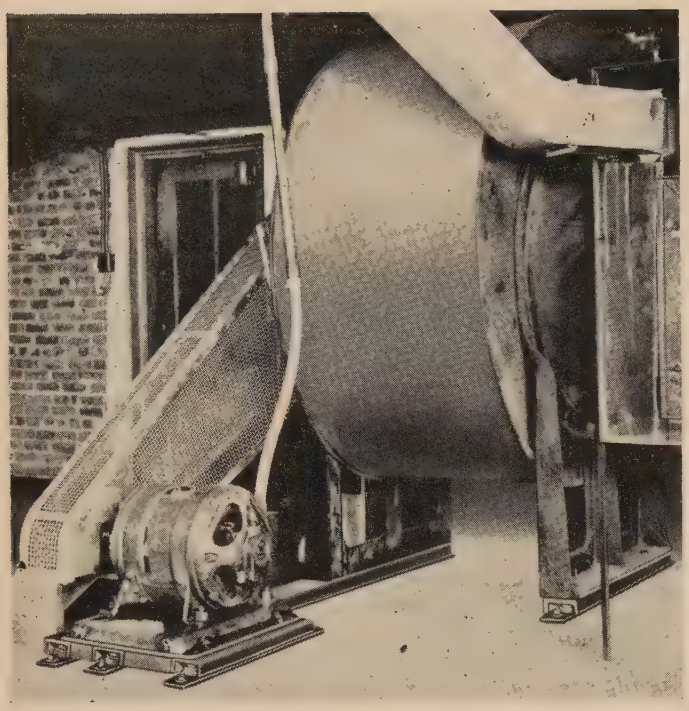
NEW ORLEANS ELEVATOR HAS RECORD YEAR

In New Orleans, the public grain elevator set an all-time record during the fiscal year 1950-1951 in the volume of grain handled, according to H. A. Sawyer, President of the New Orleans Dock Board.

During the fiscal year ending June 30, 1951, the elevator received 70,721,510 bus. of grain. This figure far exceeds the 1948-1949 volume of 67,198,384 bus. Profits for the fiscal year just ended have been estimated at approximately $750,000 by Sawyer.

The grain elevator has a capacity of 2,622,000 bus., and the new record handle indicates it had a turnover of 27 times its capacity. Chas. J. Winters is superintendent.

He who gives himself airs of importance, exhibits the credentials of impotence.—*Lavater.*



An integral fan-motor isolation

Reducing Machine Vibration in Grain Processing Plants

By FULLER ROSS

ALONG with manpower problems, the rate of production per man-hour, the grain and grain processing industry today must likewise confront that of getting the utmost out of "machine hours" and this entails at least remedying a 10% loss of potential energy and machine performance through milling machinery vibration.

The grain processing industry has tended to greatly underestimate efficiency and production loss and increased operating costs due to such vibration. Only in recent years has the true picture of such loss through vibration transmission and the realization that correctives are possible come to industry leaders.

Reliable estimates based upon careful tests and studies reveal a somewhat surprising tally of "costs" due to vibration, inherent to a more or less extent in nearly every type of machinery used in the grain processing industry today.

Possible Correctives

(a) Save on plant structure's maintenance cost. With proper isolation of machinery, the building foundation need be less thick and much less costly to lay. Also true of the upper floors.
(b) Bring greater all around operating efficiency.
(c) Add to the employe's safety margin and tend to improve the worker's health.
(d) Reduce spoilage in production processes.
(e) Greatly increase output per machine.
(f) Reduce maintenance costs by having fewer replacements of wearable machinery parts—such as dies, bearings, cutters, etc.

The fact is that nearly any piece of machinery may show a reduction in **potential** output of from 10 to 12% and even more, unless proper correctives are applied to offset these tendencies. This vibration which is, in effect, useful and usable energy, finds its terminus in the foundation of the building on the ground below.

Useless Load on Machinery

The effect of this waste, it will be recognized, is to put a tremendous useless "load" on the industry's machinery "plant" at a time when every effort is being strained to produce more, to produce it faster, and to produce it better in both defense and civilian products.

Year by year remarkable progress is revealed in eliminating machine vibration and the topic is of direct and special interest to the makers and users of machinery right now. Tests and studies have proved that the proper and scientific isolation of machinery to prevent the transmission of vibration has become one of the really important phases of modern engineering.

(Suggested reading on this topic, "Stop Vibration", Miller, Publisher, 10-28 Forty-Seventh Ave., Long Island City, N. Y.)

Isolating Vibration Conductors

In an interview with this writer, B. A. Doane of the Vibration Eliminator Company, pioneers in this field, said: "Because concrete, steel, and other building materials are all conductors of vibration, all grain processing mechanical equipment should be isolated. Properly planned isolation acts not only as a shield to prevent vibration transmission to the foundation, floor, the building structure and surrounding equipment, but it also materially reduces dynamic bearing loads.

"When any machine is rigidly mounted upon a solid support or foundation, vibration loads are added to the normal operating loads. These combined loads are frequently of such magnitude as to definitely increase the wear of moving parts. The cushioning effect of isolation permits all parts to operate freely, with a resulting reduction in wear.

"Effective isolation is not the mere interposition of a resilient material or system. Incorrectly applied isolation may even aggravate the vibratory condition. To be of any value the isolation material or system must be resilient under the condition of installation; that is, under the impact of operation, it must have a certain predetermined action.

Proper Loading Essential

"Briefly, if the isolation system is underloaded it cannot be resilient. Its reaction will be the same as that of a solid mass, and it will transmit vibration. At the other extreme, if the isolation system is overloaded, fatigue results, with a complete breakdown of the resiliency factors. It is clear to the trained engineer, therefore, that the isolation material must be properly loaded for maximum isolation efficiency. Isolation cannot be purchased by measuring the base or foundation and ordering so many square feet. In practically every instance the isolation material will be definitely underloaded and virtually useless."

Modern Isolation Units

Of course, it is a well known fact in the machinery field that a blanket recommendation for isolating any and

all types of machinery is impracticable. Yet, as has been pointed out, each job doesn't necessarily have to be a "tailored" one thanks to improvements in modern methods of isolation. The present wide selection of unit isolators brings to the machinery manufacturer or user a choice of vibration eliminators all designed to remedy that most common factor —"underloading". Not only do these modern isolation units make it possible to "control" the load, but their installation is an extremely simple matter under proper supervision, based upon experience.

To a great extent rubber has become the basic factor in designing and building the new range of vibration isolators which today can be adapted to meet any need. It should be remembered, however, that rubber does not have elasticity by **volume.** For this reason, rubber under compression evidences resiliency only by bulge around the edges, and is limited in use as a vibration eliminator.

However, the vibration isolation engineer today utilizes the full advantage of the natural elasticity of rubber by employing moulded rubber or rubber bonded to metal both having cross sections that permit them to act freely in shear. This same principle of rubber-in-shear has been used to develop a variety of unit isolators having provision that permits bolting to a machine and also the supporting structure.

Supporting Small Loads

Problems of resiliently supporting small loads ranging from a few ounces to several pounds present difficulties not found in handling heavier loads. In overcoming these difficulties, no isolation material has proven more effective than rubber. Because of this effectiveness, isolation engineers have developed a wide variety of designs using rubber-in-shear for resiliency and rubber-in-compression for stability, thus enabling the application design engineer to consider the particular problems of installation when selecting the units for the job.

The application or adaptation of these standard units and the conception of new designs for special milling processes are a large part of vibration isolation engineering today, and eliminate the possibility of overlooking local conditions peculiar to a specific job, which exist when an attempt is made to select mountings from a catalog.

Cork

Cork, too, has its place in modern vibration elimination. Natural cork plates call for the same accurate loading for maximum efficiency as do other systems of isolation. The table of loadings that has been calculated for these other systems may be used just as successfully for natural cork plates. Results are greater efficiency and lower cost. Cork plates are made from a pattern of strips of pure natural cork with a steel confining frame. Natural cork plates may be installed under conditions where they are in continuous contact with oil without losing their efficiency.

Eliminates Rails

The use of vibration eliminator rails for certain types of grain processing machinery has greatly increased. These rails are supplied both in rubber-in-shear and in cork.

Both designs are convenient and effective, since they are supplied in lengths to meet conditions, and the built-in-isolation units are located according to the distribution of the weight of the machine. These isolation units are metal housed and locked in place. The housing provides a level bearing surface on the cork or rubber.

Rails are drilled and tapped for machine foundation bolts with ample threading surface. Where driver and driven are not on a common base or where the machine base itself needs continuous support the rails provide this necessary base and support. These rails also help to distribute the weight over the flooor area since the bottom member extends the entire length of the rail. Installation is relatively simple as extending lugs at the ends of the rails are drilled for lagging to the floor. The cork rails are used where contact with oil is possible. The rubber rails are recommended where the supporting structure is not rigid.

Today, vibration of grain processing machinery is a known factor, and its results are a known fact. Modern engineering has given increased attention to this important production-management question, and the results of the modern engineers' work have been realized in the design and manufacture of greatly improved and flexible vibration isolators now at the service of the nation—at a time when every possible effort and every possible potential is vitally needed for defense.

TIPS ON VIBRATION ELIMINATION

It is unwise to put a solid sheet of cork, rubber or other material under a complete base.

Don't neglect the overhang of the drive or the machine will rock.

Use a material that won't soften in hot weather or harden in cold.

Allowance for uneven distribution of weight is vitally important.

Avoid any isolator that is brittle.

A "lifeless" isolator is sure to pact and settle in time.

Isolation material should not be too hard or too soft.

Driver and driven should always be mounted on a common rigid base before isolating.

THE HONOR ROLL

The Omaha Chapter boys are leading the procession. It's time that a few other chapters got busy. By all means see that YOUR name appears in this distinguished list! Up to July 15, the standing was as follows:

Vincent Blum, Omaha	4
A. R. Bourdonnay, Ft. Worth	1
Jerry Lacy, Omaha	2
Earl Mahan, Council Bluffs	2
W. R. Appleman, Chicago	1
John Back, Chicago	1
Donald Burke, Omaha	1
Vern Erickson, Spokane	1
Lloyd Forsell, Chicago	1
John Goetzinger, Omaha	1
Harry Hanson, Chicago	1
A. W. Johnson, Seattle	1
R. K. Krebbs, Kansas City	1
Jack Kitching, Buffalo	1
Lee McGlasson, Seattle	1
Edwin C. Murray, Oakland, Calif.	1
Ted Musser, Erie, Pa.	1
Kenneth Sacre, Minneapolis	1
Herbert Sales, Omaha	1
Dale Wilson, Chicago	1
Charles J. Winters, New Orleans	1
Total	26

OMAHA APPOINTS CONVENTION COMMITTEES

On June 12th a dinner meeting was held at the Empire Buffet, Council Bluffs with 21 Omaha SOGES Chapter members attending. The Society members voted April 16-19, 1952 for the 23rd annual convention, to be held at the Hotel Paxton, Omaha, Nebr. Committees were appointed for the convention as follows:

Convention Chairman: John Goetzinger; *Vice Chairman*: Charles Walker.

Reception: Chairman Charles Walker; Fran Guian; George Knauss; Jerry Lacy; Bob Lare; Frank Guinane.

Registration: Chairman Jerry Lacy; Charles Grossman; Herb Sales; E. W. White.

Program: Chairman, John Goetzinger; Charles Walker, Jerry Lacy; Vince Blum.

Transportation: Chairman Herb Sales; Earl Mahan; Bob Lare; Geo. Knauss; Jim Shively.

Publicity: Chairman George Knauss; Charles Grossman;; Ollie Jensen; Charles Empkey; Clarence Meyers.

Banquet & Entertainment: Chairman, Vince Blum; Herb Sales; Jerry Lacy; Earl Mahan.

Finance: Chairman Don Burke; John Goetzinger; Fran Guinan; Herb Sales.

Round Table Discussions at Buffalo

BARLEY AND MALTING

C. Wallace Clark, Recorder

MEETING called to order by Panel Chairman Edgar A. Josephson. He started the meeting with a discussion on the various kinds of barley. Also the various means of mixing barley.

A member started off the questions and answers about mixing malting barleys. Mixing of the barley can give you a lot of trouble as was stated by a member of the panel. The discussion was opened for questions, bringing out questions that brought out answers from various members of this panel, members stating their experience with the mixing of various kinds of barley.

The panel discussed the Canadian malting barleys along with this country's malting barleys. Questions and answers came out of this meeting regarding the mixing of these barleys. The views of the maltsters were discussed and various thinking along these lines was expressed to length by the members.

By the interest shown by the members I think you will find that a lot of good ideas came out of this panel due to the interesting questions and answers that were passed across the table. The discussion continued with across the table questions and answers regarding the following:

Grading; handling; storing; cleaning and sizing, malting and processing of barley.

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CORN-MILO-KAFIR

John Goetzinger, Recorder

MEETING was called to order by Vincent Blum of Omaha Elevator Company. The subject "Corn" was discussed first. Corn testing as low as 51 lbs. was reported in Omaha and Dakota reports corn as low as 40/41 lbs. test.

The problem of drying was discussed quite extensively and it was stated that by scalping the corn before going into the drier, it reduces the beeswings, fuel consumption and fire hazard, also gives a better quality of corn. It was claimed the cob sticks in the ducts and holds back corn that becomes cooked.

Good results were reported by drying at 190° F. regardless of moisture content by controlling the feed through the drier. Equally good results were claimed by drying at 200° to 220° at greater speeds, during from 20/25% moisture to 15% moisture in one operation and drying 30% moisture in two operations 30 to 20 to 15%.

It was generally agreed that it is good policy to have at least two thermometers, one where the air goes in and one at the discharge.

High moisture corn becomes bleached due to chemical reaction but drying at low temperatures decreases bleaching, therefore a tougher and brighter corn.

There was much discussion regarding moisture testing equipment. Opinions were divided as to the merits of the several types and their ability to give prompt accurate readings.

During steel shortages, old belting was suggested to line hoods and spouting which has also reduced the breakage and lasts a fairly long time.

It was also found that leveling off the bin tops eliminates heating and infestation which usually occurs first in the high peaks on the tops. Leaving a reasonable space between the grain and the top of the bins has proven a good idea.

On milo and kafir, the white milo is soft and breaks up very easily. 13.5% moisture is top for good storage.

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FEEDS AND CEREALS

E. G. Burdick, Recorder

VICE-CHAIRMAN Robert Bredt, Minneapolis, opened the discussion due to the absence of Panel Chairman Gilbert P. Lane. The cereal part of the discussion was not touched upon, due to many participants not being interested.

The discussion started on mixing of Feeds, Draver Lines, Percentage and Weight Feeders, Horizontal and Vertical Mixers. The general consensus that the Horizontal Batch mixing system was the best, although the tactual tonnage was less per hour. A better and more accurate formulated feed could be produced, when all ingredients are weighed into the batch, thus holding the inventory of raw ingredients in line.

The human element of error in testing percentage lines was discussed. The most practical system of feed mixing was agreed upon to be, by using two 3-ton horizontal mixers, bulk bin storage, a spiral conveyor to the scales, which are over the intake of the mixer. Each spiral conveyor is controlled by a quick-acting starter button; this allows the conveyor to stop instantly when the required weight has been obtained.

The subject of bridging in bins, separation in bins, was next discussed. It was suggested to remove the hopper buttons in bins that have a tendency to bridge or hang up. Then install a flat bottom bin with a series of square openings in the flat bottom. Next install a mechanically driven arm above the bin bottom with a series of chains hanging over the bin openings. This arm revolves approximately one revolution per hour. This system allows each opening to be opened once each hour.

The next subject was pellets and crumbles. The general opinions agreed that high pressure steam was best for making pellets and crumbles, although a higher percentage of shrinkage was realized when high pressure steam was used.

It was agreed that fines should be left in crumbles, from the standpoint of reducing cannibalism in the flocks. The feeders of straight mash have very little cannibalism. The highest percentage of cannibalism was found in screened crumble feeds. This is due to the fact, that the bird does not work hard enough when eating pelleted and screened crumbles. Hence, in its leisure time, it picks at the other birds in the flock. The manufacturers' view of leaving fines in crumbles was agreed to be less maintenance, and more production. Therefore a greater profit from crumbles could be realized.

Next was the discussion of heat in the pellets at the pellet machine. The Universal Pellet Mill has about 212°. The Sprout Waldron Machine has about 190°. There was no obtainable temperature recordings for the California Pellet Mill.

The next subject was the different ways of adding medication to the mashes. Some used soybean meal as carrier, while the best results have been found to use finely ground corn meal as a carrier.

The next and last subject was the various methods, now in process of experiment, to obtain a quick protein analysis of feeds. Some of the manufacturers have gone to great length in experimental work along these lines, but at the present time, no system has been adopted.

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SANITATION AND FUMIGATION

Elmer R. Hapke, Recorder

EVERY elevator operator today realizes that good housekeeping and cleanliness in his plant must be maintained in order to eliminate fire and explosion hazards. Properly designed dust collecting systems have greatly improved dust conditions in elevators. However, in most cases they have not completely eliminated dusty conditions. There are times when suspended dust is an explosion hazard. Therefore, ventilation wherever possible should be permitted to enter because fresh air will greatly reduce and possibly eliminate this hazard.

Frank Carlson of the Insurance Underwriter's Association makes periodic inspections of elevators in various localities. It is usually his ex-

perience to find that old dust is not always cleaned from beams, ledges and out-of-the-way places in the elevator. The working floor space is most always found to be reasonably clean. However, the old dust which is the dangerous element is permitted to remain undisturbed for long periods of time. More attention should be given to our house cleaning needs to insure our employes that we aim to rid our elevators of the possible fire hazards.

P. A. Kier of the National Biscuit Company has inaugurated a rating system for good housekeeping throughout his entire plant. The supervisor from each department is requested to make a weekly inspection of his respective unit. Housekeeping conditions are recorded on a rating chart. The letters A, B, C, or D are used for classification.

When an excellent job is done on housekeeping, the letter "A" is recorded on the chart. "B" is used to denote a good condition. "C" for fair and "D" for poor. The chart is returned to the headquarters division where it is carefully checked. Immediate attention is given if and when a poor mark is recorded on any chart. This system has proven successful because every employe is conscious of the fact that his housekeeping conditions are being checked and recorded. Therefore, more effort is exercised to do a thorough job of cleaning.

Sanitation in the elevator is naturally a part of good housekeeping. Cleanliness of washbowls and toilets is a "must" to prevent any possible chance of skin or other disease. Rats and mice are a serious sanitation problem in and around elevator property. A new effective rat poison known as Warfarin is now available to us. This chemical has given wonderful results according to a report from the California Dept. of Agriculture. There are also other materials on the market which are known to be very effective. We all realize that rats can destroy property as well as spread disease. Therefore it is our duty to eliminate them if at all possible.

Fumigation of Grain for infestation was discussed and Frank Blodgett of the Weevil-Cide Co. offered several suggestions which will benefit the elevator operator. We all realize that the elevators have many problems with weevil infestation in grain. It is necessary for elevators to react more sharply because of complaints from milling industries. The tendency is more and more in the direction of using grain fumigants when grain is received into storage.

Mr. Blodgett does not recommend treating individual carloads of wheat when they are first received into a bin.

Usually a bin of wheat will be transferred after it has been in storage a short time. Treatment is recommended when the transfer is being made. Manufacturers of liquid grain fumigants will usually recommend 1¼ gals. application to each 1000 bus. Under normal conditions this amount should be sufficient. However, 1½ gals. per 1000 lbs. will do a more effective job. A continuous application is not advisable. Best results can be obtained when the required amount is poured into bin on each one thousand bushels layer of grain. If the quality of the grain does not warrant extra handling, then the bin after fumigation will not be transferred for a period of time. When a bin of grain is not transferred for a period of 60 days after fumigation, then we should find that we have a 100% kill.

TELL US ABOUT IT

Superintendents of flooded grain elevators and grain processing plants are requested to write us about their experiences. Fellow-members of SOGES will be interested in these first-hand accounts of a major disaster. If enough letters are received, GRAIN will publish them in the next issue. — Editor.

Training Methods for Materials Handling

By DONALD C. RHODES

WE HAVE DEFINED material handling as "The art and science involving the movement and storage of materials". We have also heard discussions on the major objectives, plus the material handling factors in analyzing one's problems. However, even after one has successfully applied all of our "know-how" and has an excellent installation – just how is one assured that it is going to function properly?

Too many fail to realize that **training** and **operating efficiency** go hand in hand. Workers and supervisors learn, whether trained or not. If not properly trained, they learn by trial and error—either from fellow-workers or from kibitzers.

Don't Neglect Training

Therefore, we can't afford not to train—and train well. If we don't do it the right way, someone else will do it the wrong way for you. We have all seen the results of either poor or insufficient job instruction—such as low quantity, poor quality, safety hazards, damage to goods and equipment, high operating and maintenance costs, excessive fatigue, and disgruntled employes.

When we ask ourselves the question "Whom do we want to Train?", we should remember two common characteristics of every human being, namely:

1. It is human nature to resent criticism.

2. It is also human nature to resist changes.

With these two factors paramount in our minds, let us explore the ramifications of our project and see in what directions and whom the tenacles affect.

It is fatal to slight this analysis because an unintentional error in overlooking an individual or individuals is the unwitting basis for destructive criticism. Naturally, adverse opinions make our "selling and training" job more difficult. Therefore, I feel that it is highly important to recheck our list of people that the installation, whether it is minor or major, affects.

Training Needs

Now, let us determine the training needs. Undoubtedly, our training list will be broken down into various degrees of importance. Department heads, foremen, supervisors, directly affected and indirectly affected employes all usually require different training needs and approaches.

To help us determine the training needs, we can ask ourselves such questions as the following:

First. Who are the better workers—such as promotional possibilities?

Second. Who are the "old timers" and those with seniority?

Third. What needs to be done to be assured of skilled replacements?

Fourth. What worker attitudes present problems?

Fifth. Which workers are most in need of training to change attitudes?

Sixth. Who are the static or apparently untrainable workers?

Logical and unbiased answers to the above type of questions soon determine just what type of training approach we deem it necessary to use.

Techniques

Training techniques can range from the relatively simple to the complex, such as:

First. Individual Instruction—either on the job or off the job.

Second. Group Discussions—using written material such as job instruction sheets combined with "round table" discussion of the overall installation plan.

Third. Combined Instruction—such as lecture-laboratory, or lecture-shop courses. Also apprentice programs, and conference session combining many of the above features.

You and I, regardless of what our job title may be, are a part of the **"management team"** where we are employed. And as such, we are constantly aware of our responsibilities for getting our job accomplished in the simplest, easiest, less fatiguing, and least costly manner. We literally pour time and money into a new installation which—by our analysis—should save us employee effort and time, or building space and overhead costs. Our knowledge and application of technical data accomplish the most complex installation. At this point, too many of us feel that our job is done—but where do we fix the responsibility for training?

"I told Wilbur that if he does buy a dairy farm, he simply MUST install modern machinery. . . . I just won't have a lot of cows around." (Agric. Leaders Digest)

Responsibility

Generally speaking, we can use these two simple rules as a guide in fixing training responsibility:

First, decentralize training as much as you can. All job-skill training should be kept as close as possible to line supervision. So much of this training is needed that this is the only practical way to handle it routinely and effectively.

Second, centralize training only when you are sure the job can't be done well by the supervisor or at least within the department. Most special-purpose instructions that cross departmental lines are centralized.

The complexity of our installation such as equipment, methods and techniques, type of employee will determine what type of training method to use effectively. However, the major item to remember is—regardless of who does the training, be sure that proper and adequate training instruction is given.

Effectiveness of training can be increased by sound, sensible policies. In addition, the cost and scope of training activities will be largely determined by policy decisions. Too many of us fail to contact and to obtain top management's complete support. It is our responsibility to make sure that these decisions are made and the policies actuated.

We, also, must follow up and report training progress. If what is taught isn't used, all the time and effort devoted to the teaching will be wasted. For this reason, give follow-up considerable attention both during and after training.

After the training has been completed, continue the follow-up, but make the employee accomplishment the direct responsibility of the supervisor, regardless of whether he did or did not do the actual teaching. Reporting of training progress is of great importance—both as a selling device and as a means of identifying areas of weak activity.

Sell the Program

We must sell the training program as disinterest is the greatest barrier to successful training. It is especially serious where training is heavily decentralized. Training must therefore

be sold throughout the company to all operating levels. This can be done as follows:

First, make sure everyone understands the needs and objectives of training.

Second, make sure as many people as possible feel a sense of participation in planning your project.

Third, start high enough in the company to get real results.

Fourth, dress up the sales story so that it really does its job.

Fifth, your personality not your technical knowledge, is your best tool for obtaining fellow-worker cooperation.

Being mainly technical men and not training men, we often ask the question, "Where is training help available?" This is a very broad question and should be clarified further—just what help do you have in mind?

If more knowledge is deemed necessary on equipment, don't fail to contact either your manufacturer, or local salesman. They will be glad to give you both written and verbal information—many will be glad to help train your workers in conjunction with your efforts.

Many manufacturers have good films on the use and operation of their equipment—don't underestimate the power of visual aids.

Contact men in other plants who are using similar equipment and they will inform you of the major points to stress, plus other valuable information, such as safety hazards, operating techniques, etc.

Plan to make some plant visitations where similar conditions and installations are in current use. Talk to the people responsible for the operations and also the workers on the job. Many helpful tips can be obtained in this manner.

As to the techniques and methods of establishing a training program, much information can be obtained from colleges and universities, publishing houses, local and national training organizations, consulting firms, and other plant organizations.

Regardless of what or where you obtain your training help, we must keep in mind that to realize the maximum from the efforts of our brain and toil, we must make sure that the installation operates profitably.

An honest appraisal of your employees will indicate that training and operating efficiency definitely go hand in hand. Therefore, the following old adage is still applicable, namely: "The best informed employe will always make the best worker". —*Before the Material Handling Conference of the American Material Handling Society in Chicago.*

"Children furnish entertainment around the house." — *Mrs. Orville McFarland, mother of 21 children.*

Care of Electric Motors

I. Open-type motors should be blown out weekly; those operating under severe conditions, daily. Use no more than fifty pounds of pressure to avoid possible damage to insulation.

II. Follow manufacturer's instructions in lubricating motors. Too much oil is as bad as too little, causing deterioration of insulation.

III. Inspect bearings weekly or oftener. Feel temperatures, examine for excessive end play, and make certain oil rings are working.

IV. Inspect brushes and commutators weekly or oftener. Make certain brushes are seated perfectly and commutators are smooth. Use proper grade of carbon brushes to prevent wear of commutator and reduce sparking.

V. Where motors operate with excessive belt tension, check the air gap between rotor and stator every

week. A monthly check of motors in average use is sufficient. Difference in the width of the gap around the circumference of the rotor will indicate extent of wear on bearings.

VI. Where motor leads are exposed to view, check them weekly to see that connections are tight, well insulated and protected, and free from oil.

VII. Inspect ground connections weekly, keeping them tight and in good condition. This is for the protection of employees, and for the proper operation of over-current protective devices.

VIII. Set up a regular schedule for overhauling motors. Most motors should be overhauled annually, while those in severe use should be overhauled twice a year or oftener.

IX. Dismantle the motor for a complete overhaul job. Wash all parts with carbon tetrachloride or some other safety solvent. Paint the windings with a good, oil-resisting insulating varnish.

X. Keep the area around the motor as clean as the motor. Arcing frequently ignites oily material that has not been cleaned up.

When fire breaks out in or around a motor, shut off the power before attacking the flames, if possible. Do not depend upon the circuit breaker operating or a fuse blowing out, but shut off the power. This will minimize damage to the motor and prevent continued arcing from re-igniting the fire. When the motor or conductors are dead, direct the fire extinguishing agent into the motor or upon whatever is burning, just as in any other fire. As soon as the fire is out, ventilate the area thoroughly to clear out smoke and fire gases.—*Safety Research Institute.*

SOYBEAN PLANT FOR TORONTO

A new 150-ton-per day soybean extraction plant has been designed and will be built for Toronto Elevators Limited of Toronto, Ontario. The order for modern U. S. processing facilities is evidence of the continuing growth of the soybean crop over a wider area of North America.

Under the contract, Blaw-Knox Co. (Chem. Plants Div.) will supply processing equipment and machinery; and will supervise field procurement, erection, and initial operation.

The equipment will be housed in a two-part building, one for flake preparation and the other for extraction, meal handling, and oil finishing. The Toronto project will be one of seven installations now in use or under construction to employ the Blaw-Knox Rotocel.

MYSTERIOUS APPLICANT

One of the faculty of Wayne University was requested to supply information on a job candidate to the Columbia University Placement Bureau. A student, intending to use the professor as a reference, had mailed him a standard office form, but forgot to include his own name. Undaunted, the professor filled out the form and returned it:

"Although there is about him an ectoplasmic elusiveness that precludes precise characterization — studious analyses of the qualities of the candidate sum up to several indubitable conclusions:

"He is definitely homo sapiens; but since apparently unshriven and unbaptised, presumably bent under the burden of original sin. His appetites and interests are generally modern and occidental; he has mastered the alphabet and probably never thought that Shakespeare wrote Bacon. He was born with a veriform appendix and thinks that the government should reduce taxes and improve its services.

"His moral sufficiency is attested by the fact that he did not break the vase of Clovis, and his normality by never having joined in the quest for the Lost Chord. Which and how much gender he possesses is mystifying, but of his essential humanity there is circumstantial, if not conclusive, evidence.

"His one conspicuous shortcoming is the lack of a name. In these days of superabundant applications, you can probably spare one and erase this deficiency."

Controlling Physical Hazards with Guards on Machinery

By ROLAND P. BLAKE
U. S. Dept. of Labor, Washington, D. C.

THE only sound approach to the control of physical hazards, particularly the safeguarding of machinery, is very simply stated indeed. We must reduce the factor of hazard to the lowest practically possible minimum. Making the machine or tool or workplace safe enough so that a reasonably careful person can avoid injury is not an adequate goal. It is not good enough. We must make it as difficult as possible for him to get hurt.

Careful analysis of typical individual accidents will quickly bring justification for this approach. In every case (barring the so-called "Acts of God") such analysis will reveal two basic causative factors, that is, **hazard** and **faulty behavior.** Two or more elements of each of these two basic factors are usually involved in each accident, but both of these basic factors are always present in some degree. A little clear thinking will show the reason for this fact.

Hazards Need Action Factor

Hazards of themselves do not injure people. One must place himself (or be placed) in contact with the hazard or injury does not result. A pair of unguarded gears does not reach out and grab the victim. Instead he (or his clothing) must come within the sweep of the teeth. A slippery spot on the floor does not trip one. It merely fails to hold the foot placed unsurely upon it. Thus we must have the factor of hazard, a chance to get hurt, and unsafe or otherwise faulty behavior, the action factor.

Obvious though this reasoning may appear, I believe it of extreme importance to stress it because of a widely advertised, and I am afraid widely accepted, fallacy that can have only resulted from superficial thinking. I refer to the use of a ratio to express the relative importance of unsafe conditions and unsafe acts in causing accidents.

Ratio Should Be Known

Much time and effort has been spent by various groups and individuals to establish this ratio. It is commonly given as 85% or 90% of all injuries due to unsafe acts and only 10½ or 15% due to unsafe conditions.

While one of the studies in this field (that made by an American Society of Safety Engineers committee) attempted to take into consideration the combination of both factors, the more widely quoted study, that of Heinrich (a monumental job covering

75,000 accident reports), did not. In this study only the condition or act that was deemed to be the major causative factor was taken account of. All other causative factors were ignored.

It seems to me that the concept itself of establishing a ratio to express the relative importance of unsafe condition and unsafe action as causative factors is unsound and fallacious. First of all a ratio indicates relative importance. But who can say which is more important, hazard control or the development of safe behavior? Both are essential.

Secondly, such a ratio established for industry in general would apply to any given plant or operation only by pure chance. It does, however, furnish a beautiful excuse for those who are unwilling to face the hard work involved in painstakingly searching for and rooting out the hazards, and coincidentally working out safe work methods and systematically training the entire working force in their use.

Thorough Investigation

Reliable and adequate causative information is obtainable only through prompt and thorough accident investigation by competent persons. Such investigation is now the practice in the establishments from which the overwhelming majority of our injuries come.

Two factors, physical hazard and faulty behavior, are necessarily present in every case of work injury. Therefore, the only sound approach is to adopt and consistently follow a policy of reducing and keeping the hazard factor to the lowest possible minimum and with similar thoroughness prosecute the development and maintenance of safe and adequate behavior by everybody at all times. This is the policy followed by the leading establishments whose names have become synonymous with low injury rates. Best safety performance, measured in terms of injury elimination, can be had on no other basis.

Reduction of Hazards

Some, having in mind conditions in your own plants, may wonder why I emphasize the physical hazard thing. The answer is simply that throughout American industry in general far too little attention has been given to hazard reduction. Unless you get into a very wide range of establishments in the various breach is between the performance of the more backward half of the nation's industry and that of its leaders.

Any of us could name a few employers whose performance is so good that it approaches perfection. Any state safety inspector could show you that in the great majority of this nation's work places great gains could be made for safety by better hazard control. He could also show you numerous establishments in which even the rudiments of safety are completely ignored.

The 85%—15% fallacy is a serious deterrent to improvement in the segment of industry where improvement is most needed. The managements who aren't doing a good job of hazard control see no reason why they should if 85% or 90% of all injuries are due to unsafe acts. Would you if you really believed the ratio?

Planning

First in the methods and techniques of hazard finding, of course comes planning. In any new undertaking hazard elimination should be a major purpose from the earliest stages of the planning. It is surprising how many hazards can be eliminated through informed foresight in the planning stage.

"Do you really think that all this blasted paper work is necessary?"

Unfortunately, few architects know much about accident prevention because it was not included in their college courses. Some engineers who design plants and plant layouts do a good job of it, but the majority don't because they didn't get it in college either.

As a result, the usual practice is still to design a building that will house the operations reasonably well, fill it with equipment and will perform the necessary functions at reasonable production rates and costs, and leave most of the safety problems to be wrestled with later by operating personnel, who are under pressure to produce and seldom have much real knowledge of hazard elimination.

If at this stage a safety engineer is employed his hands are largely tied by the mistakes and omissions in the planning stage. So he does the best he can to build defenses of safe practice and safety consciousness around the hazards. How much better it would be to start with hazard elimination and develop safe practice in addition to it rather than in place of it.

With a plant in being, planning can apply to changes, alterations and rearrangements. Over a span of years, these can sum up to an important total, but they can never take the place of pre-planning.

Middle Ground for Inspection

Hazard inspection was all important in the early years when we were learning the hows of hazard control. Unfortunately, many managements found themselves with over detailed, too time consuming inspection systems and curtailed them too much. There is a reasonable middle ground. Every management will find that a systematic inspection system suited to its needs will find most of the continuously developing hazards of an operating establishment before they yield their unhappy fruit of employe injury. Most large plants have such inspection systems; few small ones do.

Job Safety Analysis

Now we come to job safety analysis as a means of finding the hazards. Its great effectiveness in developing safe work methods and safe job practice has tended to obscure its value in finding the hazard points. Actually job safety analysis, if competently and thoroughly carried out, is extremely valuable in hazard reduction because it brings the hazard points to light so that maximum attention can be given to their elimination or reduction. Its value for this purpose can hardly be over-emphasized.

Finally we come to our accident post mortem — accident investigation. If we investigate each accident thoroughly and competently with the dual purpose of finding and evaluating the hazard factors, as well as the behavior factors and if we do everything possible to reduce the hazard factor we are making progress.

In this as in all other phases of our programs, we should remember that hazard reduction represents a positive enduring gain, while safe behavior, necessary as it is, is still an undependable thing that may waver or vanish without warning. It is never a satisfactory alternative to hazard elimination but should always be striven for as an additional essential.

Hazards Not Self-Correcting

It seems silly to point out that hazards never correct themselves. Yet failure to take prompt action to correct each correctible hazard as it is brought to light is so frequently found that the above emphasis of the obvious is fully justified. "We leave undone those things which we ought to have done" could well be the self humbling statement of a great many managements.

I suspect this slowness to apply

positive means of hazard correction is at least partly due to our disreputable friend, the 85%-15% fallacy. An executive who thinks in terms of the 85% will give little thought to hazard reduction nor will he be inclined to spend even moderate sums on it.

I would like to find a better term than "guarding" to use in connection with reducing the factor of hazard in the operation and servicing of machinery. A guard is a gadget or device or barrier you add in order to protect people against a hazard. It does not reduce the hazard. It merely erects a barrier in front of it. If it fails or is removed the hazard is wide open again.

After-Thought Guarding

The only sound approach is to put hazard elimination first and leave to guarding only those hazards that cannot be eliminated through design or otherwise. While there are some exceptions, the prevailing practice can properly be described as "after-thought guarding." That is, most machinery users buy a machine that will perform the required operations for the lowest competitive price. When he gets it he adds whatever guard he thinks is needed or he waits until a state or insurance inspector calls and tells him what guarding is required. In other words the prevailing practice is to guard as much as is necessary to comply with legal or insurance requirements.

Instead the basic philosophy should be to reduce the factor of hazard to the minimum first, leaving only the uneliminatable hazards to be protected by guards. All guards should be included in the machine design to be functional parts of the machine, not contraptions added afterwards.

Some may think that the matter isn't important. You may believe the often heard statement that so small a proportion of the total worker injuries is chargeable to machinery that the matter isn't very important. If you think so you are wrong unless you also consider unimportant a total of some 250,000 to 300,000 disabling injuries per year, of which from 40,000 to 50,000 involve permanent partial disabilities with several hundred permanent disabilities and deaths.

Basis of Figures

These figures are based on the analysis of the overall reports of compensated injuries from several leading industrial states. They may be either low or high but they certainly aren't wild enough so that the accurate figures, if they were obtainable, would make the volume of injuries chargeable to machinery look relatively unimportant.

The proportion of machinery injuries that could be prevented by better safeguarding, or rather the number that should be charged to the failure to correct correctible hazards through safer design, better guards, and the like, can only be guessed at. However, the author has studied this condition through many years by the analysis of accident reports supplemented in a very substantial number of cases by the findings of carefully detailed accident investigation.

Half of Injuries Preventable

I have also discussed the matter with many firing line safety engineers, whose work takes them into a wide range of establishments. It is my considered opinion that at least half of all injuries chargeable to the operation and servicing of machinery could be prevented by better safeguarding, that is by changing the prevailing practice of "afterthought guarding" to one of "forethought safeguarding."

It has been realized for a long time that the situation is very unsatisfactory. ASSE, for at least 20 years, has had a committee charged with the "promotion of guarding machinery at the source." The International Assn. of Government Labor Officials has had a similar com-

mittee for at least a dozen years. Some of the states have tried to meet the situation within their own borders.

Little has been accomplished because the diversity and magnitude of the various problems involved are far beyond the capacities of any single agency, group, or state. It is apparent that a well organized, nationwide program in which all the various interested groups join forces, is essential if satisfactory results are to be secured.

Accordingly, the Engineering Committee of the President's Conference on Industrial Safety asked the Industrial Conference to take the leadership in the development and prosecution of such a program. The Industrial Conference received this request favorably and appointed a committee with Dr. Yant as chairman to work it out. Promising progress is being made.

Exploratory Work

The exploratory work done by the ASSE and IAGLO committees, and by the Bureau of Labor Standards at the request of the IAGLO committee, emphasize the following factors:

1. Machines should be fully safeguarded by those who design and build them because:

(a) The manufacturer of a machine knows best what his machine will do and is in a better position than anyone else to design it and guard it for the maximum in safety and practicality.

(b) Design is of such vital importance to safety that certain machines, as for instance the ordinary circular (table) saw, cannot be properly guarded unless the machine and the guarding are designed for each other; that is, the guarding must be built in.

(c) In general, a satisfactory guarding job built into a standard model will cost not over half as much as similarly effective guards (if equal effectiveness is possible at all) added later.

(d) "After-guarding" rarely looks right. A guard should be as well built and look as good as the most finely finished and carefully made part of the machine. A cheap looking guard on a machine is not giving safety the respect that is due it. How can either workmen or foreman have much faith in an attitude toward safety that puts a rough looking, home-made guard, or any "afterthought" guard on a finely finished new machine?

(e) Probably most important of all is the fact that a very large proportion, probably a large majority, of the common hazardous machines go to small establishments lacking safety viewpoint, and who, moreover, have at best infrequent contact with men experienced in the safeguarding of machinery. Were standard models of these machines fully safeguarded in the process of manufacture, this condition would be greatly improved. It has already been done with the common type of pedestal abrasive wheel.

2. Discussion with a number of machinery manufacturers have brought out the following points:

(a) Manufacturers are generally willing to cooperate with any practical program to get safer machinery and equipment, but are largely governed by consumer attitude.

(b) Consumer interest in fully safeguarded models must be stimulated. At present, with most, safety is an afterthought. Few orders include guarding. Purchases are mostly on a basis of prices without guards.

(c) Consumers can be reached through state inspection, publicity in trade and safety journals, trade associations, and through their insurance carriers.

(d) Definite detailed standards and specifications to guide manufacturers are needed.

From the studies made to date, it seems clear that if manufacturers

are to adopt generally the policy of safeguarding fully the machines they produce and selling them on that basis, certain conditions must be provided. These seem to be:

(a) State codes, standards, or other requirements on which approvals or acceptances are based, must be free from conflicts.

b. Standards and specifications for safeguarding must be sufficiently complete to serve adequately to guide the manufacturer in designing and constructing the safeguards.

At the request of both the Engineering Committee of the President's Conference and the IAGLO Committee on Machinery Safeguarding the Bureau of Labor Standards is making a detailed analysis of the machinery codes of the various states in order to bring the conflicts to light. The findings are being transmitted to the IAGLO, which is prosecuting a program of eliminating them.

The following appears to be a reasonable summarization of the situation:

Consider the User

User safety should always be a vital consideration in the design and manufacture of any machine. Not only should the manufacturer build the maximum of safety into the machine he produces, but point-of-operation guards should be considered vital parts of each machine and be designed and constructed to function as effectively and as long as any other part of the machine. Standard models and prices should include guards.

While the manufacturer must meet his customers' wishes and can manufacture only that which he can sell, he can and does habitually do much to guide the judgment of his customers. Some manufacturers are doing excellent work along these lines to advance the cause of safety, but in the main they have not yet realized the important part they can and should play in building safer machines and fostering the demands for them. The problem is basically one of consumer demand. The great majority of machines are ordered with little or no thought of the safety of the operator; or, if his safety is thought of, the purchaser expects to apply any needed guards later.—*Before the National Safety Congress, Chicago.*

LABOR DEPT. HAS SAFETY BOOKLET

Increased manpower in defense industries will mean the need for increased safety vigilance, particularly in those plants doing Government contract work under the Walsh-Healey Public Contract Act.

A booklet containing general safety and health standards to guide interested officials in the administration and enforcement of the Public Contracts Act has just been issued. The booklet was prepared by the Labor Department's Bureau of Labor Standards in cooperation with the Wage and Hour and Public Contracts Division.

Free copies of the booklet, "Safety and Health Standards," may be obtained from the Wage and Hour and Public Contracts Division, Department of Labor, Washington 25, D. C., or at the Division's regional offices.

WHO WILL SPEAK FOR DEMOCRACY?

How many of us ever take the time to think, or to speak, on the meaning and the blessing of our democracy—this free America of ours?

We take such things for granted. But not so with someone from beyond our borders. As, for instance, 17-year-old Gloria Chomiak, who was born in Canada of parents who had fled from Russia. She wrote, in a prize-winning essay, in part:

"I speak for democracy, because two generations back my ancestors could not; because if I do not speak for it—if many more do not speak for it, there may come a time when we, too, will not have the right to do so . . .

"We who believe in democracy cannot trust to our living it alone. We must stand up, and speak, and be heard in its cause."

Getting the Most Out of PILLOW BLOCKS

Questions

1. Match the following pillow block characteristics:
   ball and socket
   split housing
   rigid angle
   solid housing
   solid type common babbitted bearing

   With the following definitions of service to which each most closely compares:
   a) has no adjustment facilities
   b) especially adapted for elevators, conveyors and shafts doing heavy work
   c) for easier installation, disassembly and inspection
   d) permits automatic lateral adjustment
   e) usually requires minimum support space and is permanently installed
2. The term "pillow block" is just another name for:
   a drop hanger
   a take-up frame
   a self-locking collar
3. When a shaft terminates at the end of the bearing inner ring, it is good practice to recommend pillow block housings supplied with a closed end plate to seal the shaft opening. — True. — False.
4. Collars are recommended for use on pillow blocks primarily to:
   keep the lubricant in
   keep the dust out
   help position bearings on the shaft
5. The "direct mount" pillow block is designed for mounting directly on shafting without using sleeves or adapters. — True. — False.
6. Pillow blocks are provided in "expansion type" because:
   shock loads would snap the shaft if it were too rigid in the bearing
   the housing expands due to friction of the shaft inside the bearing
   the shaft itself expands, and contracts, especially long shafts
7. Pillow blocks may be found on which of the following types of industrial equipment:
   fans and blowers
   bench grinders for rough work
   conveyors
   elevators
   mill trunnions
   winding rolls
8. Pillow block bearings are manufactured to engage the shaft by which of the following methods:
   tapered adapter sleeve
   locking collars and set screws
   babbitted, allowing shaft to run free inside the bearing.
9. When recommending a pillow block of the adapter sleeve bearing type, you would naturally allow for clearance *after* tightening of the adapter on the shaft, as well as for its original clearance.
   — True. — False.
10. The split type, or common flat box pillow block has a power capacity:
    not over 3 hp.
    not over 10 hp.
    not over 15 hp.

11. Self-lubricating ball and socket type pillow blocks have a capacity up to 300 hp. — True. — False.
12. Solid housing pillow blocks generally are oil-lubricated; split housing blocks usually are grease-lubricated. — True. — False.
13. For the man who insists on as much bearing support as possible for the shaft, you would recommend a pillow block with a wide inner ring. — Yes. — No.
14. There is trouble with workers who pry off caps on split housings and damage the mating faces. As one remedy you would suggest installing blocks with tapped dowel pin holes in the housing cap, with standard thread bolts as jack-screws to raise the cap off its base automatically. — Yes. — No.

Answers

1. The ball and socket type (d) permits automatic lateral adjustment; the split housing (c) is recommended for easier installation, disassembly and inspection; the rigid angle (b) is especially adapted for elevators and conveyors, etc; the solid housing (e) requires minimum support space and is permanently installed; and the solid type common babbitted bearing (a) has no adjustment facilities.
2. The term pillow block isn't synonymous with any of the three terms mentioned.
3. It's true, and it is good practice.
4. Collars position bearings on the shaft and permit bearing inner ring and shaft to rotate as a unit.
5. That's true.
6. Pillow blocks are provided in "expansion type" because the shaft expands and contracts.
7. They may be found on all six types of equipment, and on countless others in the power transmission, materials handling and related fields.
8. They are made to engage the shaft by all three methods.
9. You would certainly allow for clearance after tightening, if you know your job.
10. Fifteen hp is recommended limit for the split type or common flat box pillow block. The bearing is the limiting factor. Some have been mounted in units up to 4800 hp.
11. That's false, their power capacity is limited to about 100 hp. Capacity of the self-lubricating rigid type pillow block goes up to 300 hp, proportional to size and shaft speed.
12. That's false. Both grease and oil are used in both types.
13. That would be one good recommendation. Or recommend a heavy series block which has a wide inner ring.
14. That's desirable, but it isn't always practical. In general, split blocks are dowelled with pins having rounded ends. This should suffice.—*From Power Distribution.*

The Real Truth About Research

AMAZED by the achievements of science during and since the war, people have become research conscious. Yet there is much general misunderstanding as to what research really is, its objectives and methods, its limitations, as well as its possibilities.

What then is the nature of this modern genie, this modern god or beast known as "research"? Research is a human enterprise, and as such partakes of all the trials and joys, satisfactions and disappointments, gloom and humor — in short, all the serious and frivolous aspects typical of any human endeavor.

If we abandon sterile technical jargon and get down to earth where the researchers live and work, we are sure to find things to inform, interest, and even amuse us — a blend of the sublime and the ridiculous.

Growth of Research

Research is big business. In a comparatively few years, research has grown from almost nothing to a multi-million dollar industry. Big corporations have split off or established large research divisions — frequently separately h o u s e d in large buildings and staffed, equipped and administered apart from production operations.

Several industrial research institutes have grown to operate with multi-million dollar annual budgets. New ones are being organized and started almost every year. Recently, also, Government has undertaken research in a big way.

Research is a gamble, a game in which everybody cheats and everybody wins. It is a game played against the restrictions of physical nature and the prejudices and shortcomings of human nature. It is a game of both luck and skill, but it is possible to play with marked cards and dice loaded in your favor, and to follow a "system" that shifts the odds definitely in your favor.

Odds Are Good

Every true research project is a gamble; otherwise it would be only an engineering application. It contains, entirely or in part, unknown elements to find or explore.

Any given research project may be a failure; however, by knowing and applying the "rules" of this fascinating game, the odds for success are overwhelming in the aggregate, taken over a period of time, or over many research projects. The phenomenal recent development of industry in this country is evidence of this.

It is the method and spirit of research more than the people who play it that count. Probably, several other countries have as great natural resources and as many individuals with as high I.Q.'s as we do; but they haven't, as yet, developed our proficiency in this exciting industrial research game.

Were it not for the fact that everybody wins and nobody loses in the long run, playing this one-sided gamble of research would be definitely unsportsmanlike. However, let no individual or company be deceived about all this. The ante is high and success in any particular research project uncertain.

Those wise in the ways of research do not expect to advance just a few dollars, then pull that marvelous handle called "research" and immediately hit the jackpot.

Fun and Adventure

Research is good fun. It contains all the elements of good sport: luck, skill, uncertainty, failure, and rich reward.

Research is exciting adventure. Columbus sought a new route to India and discovered, instead, a new continent. So, in research, it often happens that while conducting research toward a particular objective useful by-products turn up — sometimes more valuable than the original goal sought.

Even an outright "unsuccessful" research project must be very badly handled or bungled not to yield much valuable training and considerable useful information along the way.

Research and the accumulation of useful knowledge is like pouring water slowly onto a dusty floor. Like the water, accumulated knowledge and scientific-technical "know-how" continuously spread over a larger and larger area.

Advance tentacles of pure, basic, or fundamental research push ever forward, sometimes rapidly, sometimes haltingly, often converging and meeting again on common ground. Unexplored islands are left behind, but those eventually are closed up. "Nothing succeeds like success" and the larger the area already covered, or the facts now known, then the greater the power, imagination, and facilities available to make still further advances.

Stock Pile Inexhaustible

The stock pile of fundamental research facts will never be "used up." Newton's laws of motion, Maxwell's electromagnetic equations, Einstein's theory of relativity, and many other

scientific achievements will always be useful in practical technical human affairs; and, no matter how modified in detail or supplemented by other new fields such as nucleur physics, old scientific facts will continue to be necessary, ever useful, and constantly used.

The objectives of industrial research are well known:

(a) Improvements of present processes or products.
(b) Development of new processes or products.
(c) Utilization of wastes or improved markets for by-products.
(d) Elimination or reduction of rejects or processing difficulties.
(e) Reduction of costs.
(f) Promulgation of a progressive, alert attitude upon all members of the company's organization, including its management.
(g) Miscellaneous.

Importance of Staff

Beyond doubt, the most important single asset of a research institute is its staff. Outstanding experts in a wide variety of scientific and technical specialties cannot be assembled in a short time — except, of course, by government edict.

Moreover, it takes time for a group of experts to learn each others' particular aptitudes and personalities and to achieve harmonious and effective co-operation. But a good staff, once established and constantly improved in size and quality by careful selection of each additional recruit, becomes invaluable.

Perhaps at this point the reader will be impatient for a description of just exactly how research actually *is* conducted. A popular impression engendered by magazine advertisements is one of a white frocked, profesional appearing individual holding up a test tube to the light for inspection — not to be confused with that familiar "man of distinction" with an up-raised whiskey glass in his hand.

Another popular concept is research "magic," or again, that astonished chemist, dumbfounded at the silhouette he has produced behind that translucent new plastic shower curtain!.

These pictures, with a proper background of mysterious chemical flasks, electronic gadgets, and perhaps a few cogwheels here and there, do bear some remote resemblance to research in so far as skillful manipulation of scientific apparatus is concerned.

Mental Activity Is Keynote

However, they do *not* convey the essence of the matter, the *mental activity*. The able mathematical analyses, the careful, laborious technical thinking and planning, the acute observation of results for the otherwise overlooked phenomena that may be the key discovery of the experiment, the tedious correlation of data and the spark of intuition or hunch

Research is method, *an attitude of mind;* the apparatus are just the "props," necessary to the show but inert and useless without the actors.— (K. W. Miller in *The Frontier* of the Armour Research Foundation.)

INSPECTOR AT WHITING

New York Central Elevator at Whiting, Ind. now has its own grain inspector at the elevator. Joseph Cable started on June 16.

SCHUBA WEDS

Edward Schuba, Hewitt-Robins, Inc., Rubber Division, Representative, and member of SOGES Chicago Chapter married Nancy Kelly on June 30.

OUT-OF-TOWN VISITORS

James Auld, Hales & Hunter Co., Minneapolis.

F. Neil Leishman, W. C. Wiedenmann & Son, Inc., Kansas City, Mo.

A. B. Osgood, The Day Co., Minneapolis.

Orland Lehnus, Norris Grain Co., Morris, Ill.

Andrew L. Crow, American Cyanamid Co., Chicago Heights, Ill.

SCRAP STEEL DRIVE BEGUN

The National Association of Manufacturers has been enlisted in a drive to collect scrap metal for the steel industry.

Record production of steel has resulted in a scrap shortage. The 16,000 members of the NAM are collecting all the scrap metal around their plants to help keep the steel mills running full blast in national defense.

IMPROVED SELF ALIGNING RETURN IDLER ANNOUNCED

A new type of self aligning belt conveyor return idler is now being manufactured by Chain Belt Company. Most belt damage from roving occurs at the edges on the return run, where the belt is closely confined between the frame and supports . . . and where it is usually out of sight, and difficult to observe. It is also important that the belt be centered entering the tail pulley, to insure central loading on the carrying run.

The new Rex Style Idler, it is claimed, greatly reduces the possibility of belt damage from roving because it provides automatic alignment for the return run of the belt without the use of side guide rolls.

DEFINITION OF A SALESMAN

A salesman must be a man of vision and ambition, an after dinner speaker, before and after dinner guzzler, night owl, able to work all day and drive all night and appear fresh the next day; learn to sleep on the floor and eat two meals a day to economize on traveling expenses so he can entertain his friends in the next town.

Must be able to entertain customers, wives, sweethearts, and stenos without becoming too amorous; inhale dust, drive through snow ten feet deep at 10 below and work all summer without perspiring or acquiring B.O.

Must be a man's man, a ladies' man, a model husband, a fatherly father, a good provider, a plutocrat, a Democrat, Republican, New Dealer, Old Dealer, and a fast dealer, a technician, politician, mathematician, and mechanic.

Must be a sales promotion expert, create a demand for obsolete merchandise, be a good credit manager, correspondent; attend all dealer meetings, tournaments, funerals, visit customers in hospitals and jails, contact all accounts every six weeks, in spare time look for new accounts, do missionary work and attend mill sales conferences.

Must have unlimited endurance and frequent overindulgence in wind and gab; know a wide range of telephone numbers in principal cities, have a car, attractive house, belong to all clubs, pay all expenses at home and on the road, on 3 per cent commission, plus 2 per cent lost sales tax.

Must be an expert driver, liar, dancer, traveler, bridge player, poker-hound, golf player, financier, capitalist, philanthropist, authority on palmistry, chemistry, psychology, dogs, cats, horses, blondes, quail—and he should be able to pronounce the name of the product he is selling.—Right off the cob.

IN THE HOPPER

The late W. C. Fields, who is once reported to have said that glasses looked better under his nose than over it, made a wonderful observation about Hollywood when an interviewer asked if he ever had the D.T.'s any time after he arrived in the movie colony.

"I don't know," said Fields, "I don't know. There's no way of telling where the D.T.'s leave off and Hollywood begins."

A motorist had just crashed into a telephone pole. Wires, pole, everything came down around his ears. As rescuers untangled him from the wreckage, he reached out feebly, fingered the wires, and murmured, "Thank heaven I lived clean. They've given me a harp."

One winter morning a snail started to climb a cherry tree. He was laboriously inching his way up when a smart-alec beetle stuck his head out of a crack in the tree and said, "Hey, y'dope, you're knocking yourself out for nothing. There ain't no cherries up there."

"Don't let it worry you, bub," snapped the snail. "There will be cherries when I get there."

Two Oklahoma censors visited the show manager for the third time, so when the manager saw them he snarled: "Well," what-d-yuh want to take out now—the bedroom scene?" "Nope," sez they, "the two blondes."

A girl bought a ticket in a big Christmas lottery, and insisted on having the ticket number 51. It turned out to be the winning number, and she received $15,000.

A reporter called upon her and asked: "Why did you especially want ticket 51?"

"Well," she said, "for seven nights

I dreamed of number seven, and seven sevens are 51, so I bought the ticket!"

"You must feel badly about your best friend running off with your wife."

"Yes, I'll sure miss him."

The husband was running around looking for his hat, when his wife asked him what he wanted it for.

"That fellow Smith across the street, just phoned and asked if I could lend him a corkscrew," replied the husband.

"Well, why should you deliver it? Let him come and get it or send over after it," said the wife.

A look of deep sorrow and dejection spread over his countenance.

"My dear," he said, "that remark of yours sums up in its entirety the weakness of woman's wisdom. It is because of such reasoning as that that women cannot lead armies, control nations, be President or take any outstanding part in the affairs of the world."

"Let's get out of here fast." said Pat as he took a drink at the hot springs. "Hell isn't a quarter of a mile from here."

A professor walking through the zoo was surprised to find the monkey cages empty. Calling an attendant he inquired the reason.

"Well, sir," replied the attendant, "this is the mating season when the monkeys remain in their houses for several days."

"Will they come out if I give them a peanut?" asked the professor.

"Darned if I know," said the attendant. "Would you?"

They're telling of the Boston salesman who visited Texas and heard one particular Texan boasting about heroes of the Alamo who, almost alone, held off whole armies.

"I'll bet you never had anybody so brave around Boston," challenged the Texan.

"Did you ever hear of Paul Revere?" asked the Bostonian.

"Paul Revere?" said the Texan. "Isn't that the guy that ran for help?"

Two brothers, one a famous baseball pitcher, the other a minister, met after a long separation. Some time was spent in exchange of reminiscences.

Finally the minister said, "How is it, Bill—I spent 4 years in college and three in the seminary, and you've never done anything but play ball. Now you're getting a salary of $30,000, and I'm getting $3,000. I can't understand."

Bill thought a minute, then said, "I'll tell you how it is, Jim, it's all in the delivery."

SICK WHEAT

(Continued from Page 10.)

reliable than a good north light and a pair of tweezers.

Due to the large volume of wheat found to contain sick wheat this year, there have been questions about any changes in inspection procedure or tighter limits imposed. There has been no change whatsoever in our methods of sick wheat determination, and as well, the conditions causing sick wheat are now exactly the same as they were 20 years ago.

Grading "Musty"

Sick wheat is the only damage which causes wheat to be graded "musty". The intensity of the odor is proportional to amount of sick wheat in the sample, and to the severity of that damage. The severity itself depends upon the temperature at-

CLASSIFIED

SITUATIONS WANTED

Man with 25 years experience in the grain and feed business. 18 years as manager. Would like position, preferably in Illinois. Am 46 years old and can furnish excellent references. Write Box W-7, Grain Magazine, Board of Trade, Chicago 4, Ill.

Position as Grain Inspector, 25 years experience. Acquainted with elevator work and boat loading. Held USDA Inspectors' license for 10 years. References on request. Write Box W-5, Grain Magazine, Board of Trade, Chicago 4, Ill.

FOR SALE

FOR SALE — Two new Vacuvators purchased about a year ago but have never been used. A truck loading cyclone and extra spouting with each machine. Hercules gasoline motor on each. Box Y-1, Grain Magazine, Board of Trade, Chicago 4, Ill.

FOR SALE — Large Anglo molasses mixer with 50 HP motor. One small Anglo molasses mixer. One large California pellet mill. One Haines molasses mixer. One Sizer Hi-Molasses pellet mill. Box Y-2, Grain Magazine, Board of Trade, Chicago 4, Ill.

FOR SALE — 8-24 ft. lengths of 22 Gage metal pipe with elbows and steel flanges at $2.00 per ft. Box Y-3, Grain Magazine, Board of Trade, Chicago 4, Ill.

FOR SALE — Grain Elevator in corn belt area in Northwest Indiana. The property is being offered for the unbelievably low price of $14,500 (half cash) due to ill health of the owner-manager. For full particulars, write Box V-12, Grain Magazine, Board of Trade, Chicago 4, Ill.

FOR SALE — One 3-H.P. Union Iron Works Electric Truck Hoist, Complete. Price, $350. Write Box Y-4, Grain Magazine, Board of Trade, Chicago 4, Ill.

tained in a heating lot and length of time the wheat was exposed to this temperature.

The exact point at which a sample should be graded "musty" is difficult to describe. Every sample is different and sensitivity to the odor varies among individuals. It is not as noticeable in cold wheat as in a warmed sample. Inspectors tend to agree on mustiness present if the sample contains around 15% or more of the average type, or second stage of sick wheat.

Turning and aeration may remove some of the odor concentration. Treating with fumigants and turpentine cannot mask the smell. Nothing can repair the damage to the germ and any deterioration developed in the dead kernel. The process is irreversible.

Sick damage profoundly affects milling and baking properties of a wheat. Some of the effects are fairly well established—others are not as yet clearly recognized and understood. The first indication in a mill that an appreciable amount of sick wheat is in the wheat mix is apt to be an unusual proportion of whole germ found in screenings from the wheat house—sick germ is easily knocked out by the scourers.

Tests I have seen show that sick wheat yields a high ash flour—as much as 15 to 20 points higher in patents from wheat containing 90% or more sick damage than in flour from sound wheat. Middlings and sizings are discolored; the flour appears dull and grey with noticable speckiness. Mustiness is noted according to the amount of sick wheat in the mix.

All these characterstics increase in intensity with declining quality values, just as the proportion of sick damage increases. They are fairly well recognized and agreed upon by those who have experienced sick wheat milling. The dull color and musty odor, of course, carry forward into bread baked from such flour. There is also some evidence that gluten quality has been damaged, yielding lower loaf volume and poor crumb qualities when deterioration in storage has been severe.

Auxiliary Tests

Only a few auxiliary tests can be made to indicate the presence and extent of damage. One of the most sensitive is germination ability of the wheat, for a dead kernel cannot sprout. However, non-viability is no indicator of how far deterioration has extended; it shows only that sickness has begun. Conversely high viability of a wheat is evidence that it has suffered little damage in storage.

Acidity values of a wheat or flour, particularly the fat acidity, furnish a fairly reliable index of the extent of damage. Experimental milling and baking tests also will indicate damage in wheat. A recent attempt with the Sedimentation test to detect increasing increments of sick wheats gave no significant results.

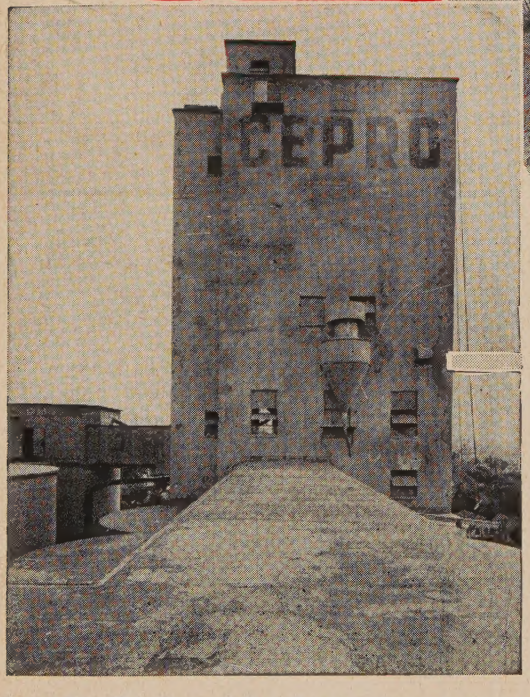
No Safe Maximum

Often I have been asked what is a "safe" maximum of sick wheat in a mill mixture. The answer, of course, is: None. Under some seasonal conditions and exigencies of trade, however, a certain amount will sometimes find its way into the mill. Again no certain figure can be quoted at which point damage in the wheat becomes evident in the flour or bread.

Sick wheat damage is not a sharply defined state—it's a range of increasing deterioration, and covers kernels which have barely lost their germinating power and with only a slighter initial loss of desirable qualities, to those which have suffered gross changes with almost complete denaturing of their components. A very forceful limit is perceptible mustiness of the wheat itself—if noted at all, the flour will bear traces of it, and certainly develop a strong odor even during the short-term storage.

Summarizing the fundamental factors of sick wheat damage: Only wet wheat above 12.4% moisture will heat—only wet wheat heating to a point around 100% F. or higher will become sick. The degree of damage depends upon the heat developed and how long wheat remains at that temperature.

Musty odor is proportional to the amount and degree of sick damage. Sickness can be arrested by cooling and drying but the wheat cannot be restored to the sound condition. The most effective and safe way of keeping wet wheat in sound condition is to mix it with dry wheat to achieve an average bin moisture of 12.4% or less.



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